PRACTICING ACCOUNTING PROFESSION CRITERIAL SKILLS IN THE CLASSROOM: A STUDY OF COLLABORATIVE TESTING AND THE IMPACT ON FINAL EXAM SCORES

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Abstract

This mixed methods study (Creswell, 2008) was designed to test the influence of collaborative testing on learning using a quasi-experimental approach. This study used a modified embedded mixed method design in which the qualitative and quantitative data, associated with the secondary questions, provided a supportive role in a study based primarily on the quantitative data set associated with the primary question. This study used a pre and posttest, a departmental final exam, given as a traditional comprehensive exam in two sections of Accounting Principles I, to test the theory of influence on learning that predicts collaborative testing will positively influence final exam grades. As the treatment in this study, one section took formative assessments in the form of chapter exams individually while the other section took formative assessments in the form of collaborative chapter exams. The final exam was a discipline wide exam written by the full time accounting faculty at the institution where data collection took place. The final exam was taken individually by all participants. The independent variable was the formative assessment exam, individual versus collaborative, and the dependent variable was the overall final exam score. The results of this study found that collaborative testing during evaluative assessment provides the same results as the same assessment given individually, at least in an online environment with fewer non-collaborative instructional methods. The biggest benefit to collaborative testing, based on the results of this study is the perception of the learner's success on the assessment, the reduction of anxiety, and the motivation to spend more time critically thinking about the questions and completing the exam. Additionally, learners perceive they are practicing criterial skills (Nelson,

1996) of the profession and are observed to practice these same skills. Collaborative testing, at the foundational course level, may not provide enough mastery of the basic concepts of the subject to improve scores on a summative assessment.

Dedication

To my wonderful husband, Doug, and my amazing daughter, Britney, thanks for all of the love, support and for being my biggest cheerleaders, I owe both of you! To my mom and dad, Bill and Sharon, thank you for the years of love and support. To Gene Trenary for giving me a love of accounting and for never answering any of my questions.

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CHAPTER 1. INTRODUCTION/STATEMENT OF THE PROBLEM

Introduction to the Study

Alternative teaching methods and pedagogy have been slow to gain acceptance in many traditional disciplines and professions, especially those with certifying exams (Beegle & Coffee, 1991; Cook & Hazelwood, 2002). However, many of the disciplines and professions have been concerned that while learners may possess high technical skills, they often lack a broader set of communication, intellectual, interpersonal, and social skills needed to be successful in the 21st century. This has been true in the accounting profession. Alternative teaching methods and theories lend themselves to integrating the technical aspect of the discipline with the set of broader skills.

Collaborative learning (Bruffee, 1999) has been one method that allows learners to practice the language, argument, and adaptability skills in the profession before they move into the workplace. Collaborative learning has provided opportunities for learners to express what they do know about the discipline while at the same time questioning this knowledge and adapting it accordingly, therefore creating new knowledge. Learners view testing as high stakes activity and therefore will take the nature of a collaborative exam more seriously than simply homework or other assignments. At the same time, many in the professions have been concerned about learners' performance on final exams as indicators of success of certifying exams.

Background of the Study

In 1986, The American Accounting Association published what is known in the profession as the Bedford Report, a report on the state of the accounting profession and accounting education's role in developing accountants. The report outlined the serious deficiencies that accounting graduates had in basic, required communication, intellectual, interpersonal and social skills (Appendix A). Graduating students had sufficient technical accounting skills but could not meet minimum standards in such skills as teamwork, conflict management, adapting to change, argument, writing, and various forms of communication.

The governing bodies, as well as the large accounting firms, made a plea for accounting educators to make significant changes in accounting education by integrating the technical aspects with a set of criterial (Nelson, 1996) capabilities that would allow learners to practice being accountants. It is possible that inclusion of collaborative learning, and more specifically, collaborative testing, in the accounting curriculum can help learners develop and practice these skills. However, accounting remains a traditional discipline, and educators still place high value on exam scores as indicators of learning, even in light of the call for changes in curricula, teaching, assessment, and evaluation methods.

Statement of the Problem

There is a gap in the research literature regarding the extent to which collaborative testing in accounting improves final exam grades. Additionally, it is not

known how collaborative testing provides opportunities to practice the profession of accounting in a broader context and how learners perceive their success on exams and retention of concepts.

Purpose of the Study

The purpose of this mixed methods study (Creswell, 2008) was to find the extent to which collaborative testing improves final exam grades. Additional purposes included examining how collaborative testing provided opportunities to practice the profession of accounting in a broader context and how learners perceived their success on exams and retention of concepts following collaborative testing.

The first objective of the study was to determine the impact of collaborative testing on summative final exam scores. A further objective was to gather feedback on how learners perceived formative assessment collaborative exams influenced that assessment score. A final objective was to gather feedback on how the learners and the instructor perceived learners are practicing criterial skills (Nelson, 1996) of the accounting profession during formative assessment collaborative exams.

Rationale

This study was conducted to determine if formative collaborative exams have a positive influence on learners' ability to recall basic content of a course on the summative final exam. Additionally, the study provided feedback on learners' perceived success

when using formative collaborative exams. The study also provided data on whether students practiced criterial skills (Nelson, 1996) during a formative collaborative exam by collecting instructor observations and learner self-perceptions.

Collaborative exams are not a widely accepted means of measuring learning in accounting education. Accounting educators, in general, believe that exams should be individual. This has often been due to the traditional nature of the discipline and the need for future CPAs to pass the certifying exam alone. However, once they are in practice, accountants do very little work alone (American Accounting Association, 1986; Nelson, 1996).

This study expanded on the limited knowledge in the field in higher education concerning collaborative testing. Collaborative learning is quickly becoming an accepted instructional method in higher education; however, the use of collaborative exams, either formative or summative, has not been as widely accepted in all disciplines or as widely researched. This study expanded knowledge about collaborative testing in higher education.

Research Questions

Primary Research Question. What is the impact of collaborative testing on summative final exam scores?

Hypothesis. There is a difference on overall final exam scores between students using collaborative testing versus traditional testing.

Secondary Research Questions.

1. How do students perceive the influence of collaborative testing on formative assessments?
2. How do learners perceive they are practicing accounting criterial skills (Nelson, 1996) during collaborative exams?
3. How does the instructor perceive practicing of accounting criterial skills (Nelson, 1996) by learners during collaborative exams?

Significance of the Study

This study contributed to current knowledge in the field of accounting education. To date, research has shown the broader set of criterial skills (Nelson, 1996) including communication, intellectual, interpersonal, and social skill set learning is not at the level needed for graduates to be successful in the work place. Therefore, graduates are still leaving the educational setting and entering the practice of accounting with technical knowledge but lacking the characteristics of a successful accountant.

Accounting has been a traditional discipline and accounting education has tended to use traditional approaches to instruction. Across the country, the primary delivery mode has been the lecture model, with some measure of case-based activity. It is difficult for innovative and creative instructors to find acceptance with alternative methods of teaching and assessment in traditional disciplines. This study helped support the effectiveness of the learning process when using alternative assessment and teaching

methods while at the same time supporting the predominate and traditional view that assessment of basic concepts is the primary means of determining that learning has occurred.

Definition of Terms

The following is an explanation of how these terms were defined and used for this study. Some of these terms may have been used in a generic fashion in education; the intent was to provide clarification for this study.

Alternative instructional methods and assessment – methods of instruction and assessment beyond traditional lecture, online learning, problem-based learning, and case studies. These learning and assessment methods include but are not limited to active, collaborative, transformational, and service learning, and the use of manipulatives. The methods are only beginning to be viewed as valid methods for learning in higher education.

American Accounting Association (AAA) – the body within the accounting profession that supports and services educators and educational initiatives. It is not a rule making body, however, it is recognized in the profession, and the issues and positions statements coming from this body are considered important to the whole of the profession.

American Institute of Certified Public Accountants (AICPA) – an organization in the profession of accounting providing support and services to practitioners, most commonly CPAs. A key function of the AICPA is writing and administering the CPA exam.

Cognitive Interdependency – The knowledge developed when a group works to construct knowledge about a given subject. The focus of the learner is on listening to other learner's communication about the subjects, then communicating their own knowledge. These communications create cognitive disequilibrium within the learner requiring reflection on the conversations, which then forces the constructing of a new understanding or new knowledge about the subject (Aik & Tway, 2003). The group constructs knowledge interdependently and uniquely from all other groups. Cognitive interdependence is one of the two main branches of constructivism.

Collaborative Exam – an exam given in small groups of three to four individuals within a class section. It is a formative assessment. Learners may not use any study aids, for example books or notes. Individuals receive individual grades based on performance on the exam and may decide to answer differently than the group.

Criterial Skills – a term used by Nelson (1996) to describe the various sets of skills beyond technical knowledge of accounting. For a comprehensive list of skill sets see Appendix A.

Formative Assessment – assessment such as homework, quizzes, collaborative exams, or other material provided to the learner to enhance learning. The learner, as well as the instructor should be able to evaluate individual learning levels of content during and after participation in the assessment.

Foundational – those disciplines generally considered to be based on a set of rules or guidelines for example accounting, computer science, and mathematics. It is generally accepted that students must have a solid understanding of these rules and regulations before being able to apply them to unfamiliar and unstructured problems or scenarios. Educators tend to see these courses as highly structured. This definition is based on Bruffee's (1999) discussion of foundational knowledge.

Non-foundational – those disciplines that socially construct knowledge within the course based on each unique community. Course content often revolves around the current political and economic environment subject to the pressures of globalization, technology, and migrant, converging cultures. Educators tend to see these courses as lending themselves to discussion, argument, and negotiation. This definition is based on Bruffee's (1999) discussion of non-foundational knowledge.

Reacculturate – a term used by Bruffee (1999) to denote the process of individuals from various communities coming together to create a new and unique community. For effective communication, the members of the community must develop social and cognitive interdependence to adjust their understanding of a given concept.

Social Interdependency – The framework created when a group works to complete a common task or goal (Johnson & Johnson, 1998). The focus is primarily on

the means to complete the task or goal, for example, methods of communication, acceptable behaviors, or assigning of roles. The group creates a culture unique to all other groups. Social interdependency is one of the two main branches of the learning theory of constructivism.

Summative Evaluation – a final evaluation of individual learning of basic concepts in a course, for example a traditional, comprehensive final exam.

Traditional Exam – an exam given to an individual with no opportunity for discussion with peers. Learners may not use any aids, for example books or notes. An individual grade is assigned based on exam performance.

Assumptions and Limitations

Assumptions. The results of this study may be generalized to other foundational disciplines using formative collaborative exams. As suspected, this study prompted additional research questions for further study within higher education, foundational courses, and the accounting discipline.

Limitations. The researcher in this study has been a proponent of collaboration in the classroom and therefore used collaborative instructional methods, mixed with other methods, to engage learners in all delivery modes of instruction: online, blended, and face-to-face. Instructors using collaboration only for exams may not find the same results as in this study. Likewise, the use of collaborative instructional methods may have an

impact on the study results. Learners in the treatment section may have practiced working collaboratively on other formative assessments before taking the formative collaborative exam, and this may have been an asset to the collaborative exam groups.

Nature of the Study

This mixed methods study (Creswell, 2008) addressed the influence of collaborative testing on learning using a quasi-experimental approach. This study used an embedded mixed method design in which the qualitative data set provides a supportive, secondary role in a study based primarily on the quantitative data set. This study used a pre and posttest, a departmental final exam, given individually to both sections, to test the theory of influence on learning that predicted there would be a difference on overall final exam scores between students using collaborative testing versus traditional testing. As the treatment in this study, one section took formative assessments in the form of chapter exams individually while the other section took formative assessments in the form of collaborative chapter exams. The final exam was a discipline wide exam written by the full time accounting faculty at the institution where the data collection took place and taken individually by all learners. The independent variable was the formative assessment exam, individual versus collaborative, and the dependent variable was the overall final exam score.

A secondary purpose was to collect quantitative and qualitative survey data (Appendices B, C, D, and E) that explored learner perceptions of the influence of collaborative exams on learning and exam success for Accounting Principles I students.

Additionally, rubrics were used to collect quantitative feedback on practicing of criterial skills (Nelson, 1996) of the profession (Appendix A). The learners in the treatment section completed these criterial skills rubrics, as did the instructor who based responses on observations of the experimental group. The reason for the collection of the secondary data was to provide support and give depth to the primary data (Creswell, 2008).

Organization of the Remainder of the Study

The remainder of the study provides a review of the literature in the areas of the profession of accounting and the need for change, collaborative learning, and collaborative testing. This review is followed by a description of the methods used to conduct this study. A careful description of the data collection process and analysis of that data has been provided, as has the researcher's results, conclusions, and recommendations. Appendices have been provided where appropriate as descriptive information for the reader. Tables are located throughout the study to provide insight to the reader on the discussion.

CHAPTER 2. LITERATURE REVIEW

Introduction

Collaborative exams are an effective method of learning and assessment for post secondary and adult education, as this literature review will show. Research has shown there is significant improvement in test scores, over individual exams, when using this method of assessment. Further, there is support that collaborative exams reduce anxiety and stress in learners especially when taking courses students traditionally find difficult to master. Students also said they felt as if they learned more and retained information they will need to recall later.

Collaborative exams have not receive wide acceptance in these difficult courses as many instructors feel that learners will need to recall the foundational materials on their own for passing certifying and licensing exams (American Accounting Association, 1986; Nelson, 1996; Albrecht & Sack, 2000). However, the limited studies done on collaborative exams have shown improvement in student retention in the course and with concepts, reduced anxiety, and development of various skills, including the criterial skills needed for specific professions (Nelson, 1996). Appendix A provides the Accounting Education Change Commission's Composite Profile of Capabilities Needed by Accounting Graduates (American Accounting Association, 1986).

Accounting has been a profession that requires solid understanding of the numerous foundational rules and regulations while at the same time successful practitioners need to acquire a broader range of skills to keep pace with the quickly changing needs of users of financial information. These skills include communication, both written and oral, presentation, teamwork, conflict resolution, adapting to change, higher-level critical thinking, problem solving, and negotiation, referred to in this review as criterial skills (Nelson, 1996) (Appendix A).

Collaborative exams have provided unique opportunities for learners in all levels of accounting courses to develop these criterial skills (Nelson, 1996). It has also increased retention of basic concepts of the discipline (Hargreaves, 2007) by allowing learners additional chances to learn while taking an exam and by discussion of concepts that they are weaker in. Stronger peers increase understanding by explaining their reasoning behind a solution at the same time developing and practicing teamwork, presentation, communication and critical thinking skills.

Accounting Education: The Need for Change

The required skills of accountants have changed dramatically in the last several decades. Accountants no longer sit alone at desks writing numbers into ledger paper and forms; technology, in the form of relatively cheap software, now does most of the technical bookkeeping work. Now accountants must have a comprehensive set of skills in many subject areas to be successful and meet the needs of information savvy users and a rapidly changing professional environment. These skills include communication,

presentation, research literacy, and critical thinking, referred to as criterial skills (Nelson, 1996). Collaborative learning and more specifically collaborative testing, facilitates the development of these skills in accounting students while enforcing the foundational elements of the discipline.

The American Accounting Association (AAA) issued The Bedford Report in 1986. This report outlined the concerns of the AAA, the American Institute of Certified Public Accountants (AICPA), and the 'Big 8' accounting firms, which was, at the time of this study, the 'Big 4', with skills that accounting graduates significantly lack. While they were not concerned with students being able to handle the procedures of accounting, they were highly critical of accounting students' abilities to communicate, both written and verbally, to present information, to work in teams, adapt to change, and think critically, amongst many other skills. The AAA issued this statement to accounting educators:

> Fifty years ago, the method of lecture together with routine problem solving was generally used. Today, that same method tends to dominate accounting teaching methods, although class discussion in the form of teacher-question and student-answer has more emphasis. The current pedagogy also emphasizes problems with specific solutions rather than cases with alternative solutions. As the number of authoritative pronouncements has expanded, textbooks and faculty have required students to learn more factual rules and procedures to apply in a rather rigid fashion. A primary focus in many cases has been on the acquisition of knowledge

needed to pass professional examinations. Learning theory suggests that such methods are inadequate, primarily because they are not conducive to creative thinking and do not motivate students to self-development. (p. 1)

Historically, practitioners in accounting and accounting educators have not agreed on who bears the responsibility to ensure that students learn criterial skills (Nelson, 1996) required in the profession other than technical accounting skills (Bloom, Heymann, Fuglister & Collins, 1994). These criterial skills (Appendix A) have seldom been part of the accounting curriculum as educators have assumed attainment of these skills happens with on the job training. Instead accounting educators focused on moving learners toward successfully passing the Certified Public Accountant (CPA) Exam. Accounting practitioners and their supporting agencies have been clear, that while this is a necessary skill, it is no longer enough to be successful as an accountant.

The accounting profession has been a respected profession that demands skill in collecting and communicating financial data. Various users make key decisions, daily, based on this data. For many years the role of the accountant remained unchanged, skillfully gathering the financial information and using the rules of the profession to disseminate it was the primary task. However, in the last 20 years, the profession found itself situated to provide a broader range of services (AAA, 1986). As the profession expanded, practitioners found that they must adapt to a more flexible, dynamic environment and integrate technology and be able to do it quickly. Further, users of the financial information now had access to the information, thus being better educated about

the rules and regulations of the profession. This has resulted in demand by users for participation in creating, disseminating, and analysis of the data (Amernic & Craig, 2004).

The practitioners in the professional setting came to understand that if accounting graduates were going to be successful they must possess a greater set of skills than just the ability to collect and compile data according to a set of rules ("Perspectives on Education," 1989). The Committee on the Future, Structure, Content, and Scope of Accounting Education (AAA, 1986) recognized the different views of those practicing the profession and those teaching the profession. The AAA stated, "A growing gap exists between what accountants do and what accounting educators teach. This gap will not be closed by efforts to update random aspects of accounting education." (p. 2)

Mautz (1974) was early on the scene to understand and begin discussion on the divide that was growing between practitioners and educators. He criticized the educational environment when he wrote,

> Relatively little effort has been made by many accounting educators to discover what accountants are actually doing in practice, what demands for skills exist in practice, and what students who plan to enter the practice of accounting most need to know. (p. 36)

He was not alone; the Cohen Commission Report of Tentative Conclusions (1977) also criticized educators when it noted, "Formal education does not adequately prepare students to meet the demands and risks of professional practice." (p. 86)

The need for educational change did not come as a big surprise to the practitioner side of the profession after the publication of the Bedford Report (AAA, 1986). Further, it was noted that educators did not fully appreciate what accountants actually did in practice and were slow to recognize the need to change current pedagogy and curricula to prepare students for the practice in the profession. In 1989, a task force with representation from the Big 8 public accounting firms (Table 1) published the Big 8 White Paper ("Perspectives on Education," 1989). A designee from each firm explored solutions for bridging the gap between the practitioner setting and the educational setting. The two primary purposes of The White Paper were to develop a comprehensive list of criterial skills (Nelson, 1996) needed by graduates to be successful in the profession and to provide direction on moving students from memorizing standards to learning how to learn by focusing on concepts and analysis. This task force also set the framework for the AAA's new body, the Accounting Education Change Commission.

This group noted seven primary categories in which graduates from accounting programs should have some minimum competency (Perspective on Education, 1989). These categories were communication skills, intellectual skills, interpersonal skills, knowledge for public accounting, general knowledge, organizational and business knowledge, and accounting and auditing skills. All seven categories were seen as interrelated and curriculum, within higher education, should support learning of these skills.

Table 1

Accounting Firms

The Big 8 – 1989	The Big 4 – 2009
Arthur Andersen and Co	Price Waterhouse Coopers
Arthur Young	Deloitte Touche Tohmatsa
Coopers & Lybrand	Ernst & Young
Deloitte Haskins & Sells	KPMG
Ernst & Whinney	
Peat Marwick Main & Co.	
Price Waterhouse	
Touche Ross	

The 'Big 8' clarified several key performance criteria within each category that graduates needed as they moved into the profession of accounting ("Perspectives on Education," 1989). Within the category of communication, 'The Big 8' outlined the transfer and receiving of information, presentation, and defense of views through various communications methods, formally and informally locating, obtaining, and organizing information in an efficient and effective manner from various sources as the criteria set. Concerning intellectual skills, it was suggested that graduates be able to problem-solve by finding solutions to unstructured problems in creative ways, while working in new and unfamiliar situations. Additionally, graduates must be able to adapt to the pressures and demands of a rigorous profession while maintaining high ethical standards and working effectively in a team oriented environment. This ability to work with teams is also a

criterion within the set of interpersonal skills. The interpersonal skills set also addresses the need for organization, delegation, motivation, resolution of conflict, negotiation, and diversity.

Although the need for change in accounting education was outlined in 1986 in the Bedford Report (AAA, 1986), it was not until 1994 that the Accounting Education Change Commission (AECC) published several issues and position statements on how these changes might be implemented. A comprehensive look at the issues and position statements pertinent to this study can be found in Appendix A. This report supported many of the findings and recommendations in the Big 8 White Paper ("Perspectives on Education," 1989). The AECC issues and position statements (Accounting Education Change Commission, 1996) provided suggestions and guidelines on how various groups associated with accounting students could help facilitate learning and practicing of criterial skills (Nelson, 1996) for application in the workplace. The AECC still emphasized the need for students to understand basic accounting principles, but given the rapidly changing profession, they emphatically stated that the focus should not be on memorizing a set of ever expanding and changing rules and regulations.

There have been several other key documents produced by committees formed within the AAA and supported by groups such as the AICPA, International Management Accountants (IMA), state CPA societies, and individuals within the profession. In 2000, Albrecht and Sack published a follow up report to the Bedford Report (AAA, 1986) and the Big 8 White Paper ("Perspectives on Education," 1989). This review of the current accounting climate was sponsored by various accounting organizations and agencies and

worked with a taskforce of practitioners. Albrecht and Sacks' report continued to make it clear that the practitioners and educators still had improvements that could be made in helping students learn and practice criterial skills (Nelson, 1996). Within their review, they did find some improvement in instruction, curriculum, and comments that are more positive from students, faculty, and practitioners. However, the changes did not appear to be enough, as widespread as hoped, or sustainable.

Accounting education has long been a discipline with a traditional bent for instruction and evaluation of learning. This was likely due to the focus of education being on the need to know a large set of rules and regulations, the rigorous nature of an accounting program, and the often-conservative nature of faculty. Educators often begin their teaching career by teaching the way that they know, the way they were taught. Lecture was the way many accounting educators and professionals were taught, and it worked for the most part. However, educators failed to adapt to changes in the practitioner environment, and, in fact, likely were not aware of the changing expectations placed on graduates.

A commonality seen in the literature outlining necessary changes in accounting education (Albrecht & Sack, 2000; AAA, 1986; Bloom et al., 1994; "Perspectives on Education," 1989) was the need for educators to develop alternative instructional and assessment methods that lent themselves to learning and practicing criterial skills (Nelson, 1996) while applying accounting basics to unstructured scenarios. In each of these documents, suggestions are made to include research, problem-based learning, technology, active learning, manipulatives, and collaborative work, to name a few. The

present study focused on collaborative learning in the context of assessment, particularly testing, and its effectiveness on retention of basic accounting concepts, for evaluation, while learning and practicing criterial skills of the profession (Appendix A).

It is apparent that accounting educators have made changes as evidenced by various articles written on some element of active learning. Sathe (2009) found that students felt more prepared to move into the workplace when given opportunities to work collaboratively in the classroom. Service learning was incorporated into a Management Accounting course (Chiang, 2008). It was possible for peer-mentors in accounting to practice what Jackling and McDowall (2008) call generic skills in helping beginning accounting students understand fundamentals. Some would argue given the current economic state and accounting scandals of the past, as do Anderson and Stanny (2003), that accounting should return to teaching the basics. They surveyed 202 local and regional accounting practitioners to determine if accounting changes in education were working or still needed fixing. Although the study concluded that radical changes to the accounting curriculum were not needed, one important finding was that these firms still believed that accounting graduates must possess professional or criterial skills (Nelson, 1996) to be successful in the accounting profession. Although additional studies do not appear to exist at this time, it still seems apparent that the students must have a minimum ability to perform criterial skills of the profession.

Collaborative Learning

Collaborative learning is a method of teaching and learning in which the knowledge expert facilitates (Tinzmann et al., 1990) various challenging active learning and problem-based activities. These activities are student-focused, participation is in small groups of three to five learners, and can be short-term or long-term in nature. Collaborative learning provides opportunities for discussion, disagreement, and consensus building among learners. Well-designed activities develop interdependency among learners by placing them in situations that will create constructive conflict and disagreement (Bruffee, 1999). These situations then offer opportunities to develop learner skills in communication, negotiation, teambuilding, conflict management, and various other essential traits of successful learners.

Further, forward thinking educators have come to understand that it is not enough to facilitate in their specialization, but they also have the responsibility to help learners acquire global skills in positive argument, decision-making, assessing theories in use, and critical thinking. These are skills, along with communication, negotiation, teambuilding, and conflict management, identified in many professions, as necessary for success in a dynamic and flexible global economy.

Bruffee (1999) suggested that through collaborative learning students begin to consider biases and assumptions and extend learning through conversation, either written or spoken. The conversation promotes the deepest learning, and change takes place in groups or communities. Each learner comes from one community culture and begins to create a new culture through collaborative learning. Through interaction in the culture, or

as Bruffee terms it, reacculturation, students learn how to become productive in the new culture. Within this newly formed community, learners practice, through discussion and activities, the accepted behaviors, vocabulary, and tenets of a specialization.

Although collaborative learning is not new to the world of adult educational research and teaching, the interest in it has grown since the beginning of the 1990's. MacGregor (1992) noted the root of collaborative learning "is not based on a single theoretical foundation or even a very clear history of practice." (p. 1) It is instead an outgrowth from many adult educational theories and has many proponents from Dewey and Piaget to Vygotsky. It has close connections to methods of learning such as active learning and cooperative learning.

In traditional instruction, the knowledge expert lectures about the required material. Here instructors may mistakenly believe they have some level of control over what and how the student actually learns. Instead, the learners are required to develop, on their own, some method to learn the material. Learners tend to resort to memorization. In the lecture method of instruction, the focus or center of the process is on the instructor, not on engaged learning. Learners attempt to gather as much information as they can on several topics and recall it at the appropriate times (Leidner & Fuller, 1998), such as exams. The lecture format is the most common method of delivering material to students; however, students do not feel it is most effective method for learning (Terenzini, Cabrera, Colbeck, Parente, & Bjorklund, 2001). Additionally, learners fail to learn how to learn when they are not actively engaged in the process.

In collaborative instruction, the instructor develops a learning environment that centers on the student and facilitation of student learning by using a variety of instructional techniques. The student-centered learning environment, according to Weimer (2002), involves five key changes for students and teachers, all of which are important to a successful collaborative environment. Weimer suggested there must be a change in the balance of power, a change in the function of content and the role of the teacher. Additionally, learners now accept some measure of responsibility for their learning and they become participants in the assessment process. These five key changes shift the responsibility for learning from the teacher to the learner and force them to reacculturate through collaboration by participating in development of the learning structure. There may still be times when short, traditional-style lectures are appropriate, but they are not the norm for a collaborative learning environment.

Assignment of a grade on collaborative assignments may be on a group basis in the collaborative setting versus an individual basis in the traditional setting. Because learners may be uncomfortable with a group grade due to past negative experiences with collaboration, greater care may be required to help students understand how feedback is received in this environment. Although the instructor still holds primary responsibility for feedback, students are likely unfamiliar or unprepared to take responsibility in providing and receiving valuable feedback to and from their peers (Weimer, 2002). MacGregor (1992) noted instructors needed to consider when and how learners receive feedback. He also addressed the need for faculty to prepare students on how to learn in the collaborative environment. This has been rarely, if at all, addressed in most classrooms;

instead, learners are told to work in groups without proper instruction on how to do so successfully. Bosworth (1994) additionally suggested that collaborative learning is more effective if instructors first learn and then teach students how to work collaboratively.

Terenzini et al. (2001) indicated, from case studies conducted, the benefits of a collaborative environment. "Results indicate that active or collaborative methods produce both statistically significant and substantially greater gains in student learning than those associated with more traditional instructional methods. These learning advantages remained even when differences in a variety of student pre-course characteristics were controlled" (p. 123).

Educators often use the terms collaborative and cooperative interchangeably but there are subtle differences between the two methods. Primarily collaborative and cooperative learning are most alike in that they both make use of small groups to complete learning tasks. The principle behind the use of small groups is similar also for both forms of learning, this principle being that learners learn best by doing, not by listening passively (Barkley, Cross, & Major, 2005). In addition, most learners do not know everything about a given topic but other learners may know something they do not, thus through collaboration learners can share that knowledge between themselves for a more dynamic learning experience.

Panitz (n.d.) suggested that cooperative learning is the more structured of the two methods. Instructors maintain complete control of the activity, and this is where collaborative and cooperative differ greatly. In cooperative learning, the small groups get a specific set of guidelines. Students cooperate to complete the required tasks making

every effort to meet the minimum standard and excel by moving beyond the minimum. The instructor will often assign roles to group members to facilitate cooperation and ensure that students participate. When the instructor determines that the class has had the appropriate amount of time to complete the tasks then he or she will collect the work and assign an appropriate grade and/or refocus the groups back to the larger class setting for discussion.

In contrast, collaborative learning, while still centered on group work, is not as structured (Barkley et al., 2005). The instructor may require the final project or outcomes center on a theme or general subject; however, the specific question to be answered is up to the group to decide. The group will also decide what methods to use to arrive at a solution. Group members may break up tasks to complete the assignment or meet together and try to complete the final product with everyone working on all tasks. The instructor acts as the consultant, facilitator, and counselor, if needed.

Both instructional methods require interdependency of learners. Cooperative learning, being the more structured of the two (Panitz, n.d.), primarily develops social interdependency within the group of learners (Bruffee, 1999). Groups members work in a way that facilitates completing the task, that is not to say that learning is not happening, but the activity is often structured in a way that requires primarily individual learning but social dependence on group members to complete their tasks. In contrast, collaborative learning allows learners to practice social interdependence while at the same time requiring cognitive interdependence (Borthick, Jones, & Wakai, 2003). Ideally,

assessments would be structured for learners to be socially and cognitively interdependent, this would provide excellent opportunities for students to learn, practice being in the specialization, and develop criterial and social skills.

There are those who embrace collaborative learning and do not see it as simply a learning tool but as an educational philosophy in itself. They apply this philosophy to all areas of life (Panitz, n.d.) and structure the majority of their classroom activities around collaborative learning. Likewise, others do not see collaborative learning as either a philosophy or theory but only one teaching method to include among many. Considering either view, student learning is the goal for educators. Therefore, educators need to consider the appropriate collaborative learning activities. The educators' and the learners' understanding and abilities will determine the extent of its use. Further, instructors need to be clear on what they wish to evaluate or assess.

Supporting Theories

Andragogy. Andragogy is the process of educating adults as opposed to pedagogy, the process of educating children. The primary distinction between each process being andragogy makes the shift from teacher-centered instruction to student-centered instruction (Knowles & Associates, 1984). Student-centered learning is one of the tenets of collaborative learning. Further, with the process of andragogy the instructional role changes from the teacher telling learners about the specialization, for instance a traditional lecture, to the teacher facilitating student discovery of the specialization using appropriate learning activities (Brookfield, 1986). This is important in the collaborative learning environment. For collaborative learning to achieve its

potential students should be provided with learning opportunities that promote cognitive and social interdependence. Proponents of andragogy have included J.H. Erikson, Jerome Bruner, Abraham Maslow, Carl Rogers, and John Dewey. Much of the study and research of andragogy has developed from these scholars, and they each contributed a unique framework or model (Merriam, Caffarella, & Baumgartner, 2007). In addition, Malcolm Knowles, a recognized American educator, used six assumptions about adult learning to develop his framework of andragogy (Knowles, Holton, & Swanson, 2005). Although andragogy was not new to the educational world, Knowles did much to bring it to the forefront and further the discussion.

Knowles developed the following set of six assumptions about adult learning: a) adults move from being other-directed to self-directed in learning, b) experience is accumulated and enhances learning, c) learning is based on social roles, d) the focus of learning is immediate application, e) motivation to learn comes from within, and f) adult learners must be able to understand why they need to learn (Merriam et al., 2007). The first of these six assumptions builds on the self-concept of the student and suggests that as the learners mature they will begin to take a larger role in directing their learning. Knowles (1984) suggested that adult learners want others to view them as able to make sound decisions, they do not want to create the perception that they can be taken advantage of easily; this leads learners to take a larger role in their learning direction.

Experience is the focus of the second assumption (Brookfield, 1986) which asserts that as learners accumulate more knowledge through growth and maturity they will use that to increase future knowledge. This experience also brings about deeper

meaning for the learner (Merriam et al., 2007). There has also been the assumption that as adult learners mature they will want to develop skills that will support them in not only the educational environment but in their personal and professional environments. The social roles of the learner will play a significantly guide what a learner chooses to learn. Some learners may find themselves forced into learning situations because of life transitions or transformational moments (Tennant & Pogson, 1995). Adult learners will likely find value in learning situations where outcomes are more immediately and easily applicable to any one of the roles they currently play in society (Knowles, 1984).

Knowles (1984) acknowledged that some external motivation to learn exists with adults, for example required learning to continue employment. However, he argues that most learning in adulthood comes from a desire to change current social status, to become a better person, or simply for personal gratification. As adult learners mature, they are often motivated to learn because of a desire to change as opposed to children where there is an innate desire to learn. Finally, adults need to understand the "why" behind the learning. They must be able to see the larger application to understand how the parts support the whole.

There are certainly other models or frameworks for adult learning. McClusky's Theory of Margin sought to place the adult learner in the context of "energy needed and the amount available" given the current life circumstances (Merriam et al., 2007, p. 93). Illeris proposed that adult learners learn on three planes, cognitive, emotional, and societal. Although, learners are learning in all three planes at all times, at a given point learners might be focusing on one plane over the other two, given current life

circumstances. Illeris' focus was on the process of adult learning within these planes. Jarvis (Merriam et al., 2007) also focused on the process of learning; however, he believed that all learning began with the five basic senses. When one of these senses registered as unfamiliar, the learning process began.

Regardless of the model or framework of adult learning researchers and educators prefer, the consideration of the social context in which the adult operates is relevant to understanding adult learning. Adult learners in the 21st century are now faced with learning environments that are impacted by globalization, multicultural communities, blended cultures, and ever-changing technology. These social pressures require educators to move from a traditional approach to instruction to using a blend of methods that provide opportunities for learners to practice performing within the specialization's community, as it has currently evolved.

Constructivism. Constructivism is a theory of education, which asserts that learners construct knowledge through communication and discussion in light of what they know. This social interaction gives the learner opportunity to reshape current knowledge by interacting with others, evaluating how others' knowledge and their own knowledge compare, reflecting on the new information and then developing a system to incorporate the learner's new understanding. In higher education, a key implication of constructivism is viewing the instructor as facilitator, the teacher guides the learner through a learning environment that includes active, collaborative, problem-based, and engaged learning activities (Ismat, 1998). Learning is student-centered versus teacher-centered.

There are several branches of constructivism, two of which are social and cognitive. Jean Piaget is the most recognized purveyor of cognitive constructivism, although Jerome Bruner also contributed greatly to the development of constructivism in adult education. Piaget and Bruner took differing views within cognitive constructivism (Ismat, 1998).

Cognitive Constructivism. Piaget believed learning was a cycle. He proposed that learning takes place in surges during this cycle (Steffe & Gale, 1995). Learners do not move to the next phase of the cycle until they are psychologically ready which happens through making errors or through a state of disequilibrium. Once the learner learns through this cycle of trial and error, the learner understands how to adapt this new knowledge to a broader context and can use this new knowledge in application to various other areas of the learner's life. This creates a learning surge that moves the learner into the next developmental stage.

In contrast, Bruner asserted that if instructors present the material to learners in a structured and systematic way it can be learned, regardless of age. The learner develops a logical method of integrating new knowledge with current knowledge. The new knowledge comes from cultural interaction and is categorized internally by the learner and processed to construct new knowledge. These culture interactions, according to Bruner, occur through a combination of representations of activity, image, and language.

Social Constructivism. Lev Vygotsky developed the Zone of Proximal Development (ZPD) within the framework of Social Development Theory. Essentially, learning is limited within a zone. For further learning to occur within this zone, learners

require social interaction to construct new knowledge (Hausfather, 2001). This is relevant to collaborative learning because social interaction is necessary for successful collaboration. Learning is enhanced because as Bruffee (1999) stated, "in a heterogeneous group that includes diverse experience, talent, and ability, people's 'zones of proximal development' overlap." (p. 37) Learners reacculturate, through social interaction, into the community.

Social interaction to promote learning requires learners within the group to have different knowledge and perspectives of a subject. Further, learners must find methods of communication that convey their knowledge and understanding of a specialization to other members of the group. All members are likely at varying stages of knowledge and skill. The community of learners must find a means to determine the level of development in individuals and then socially push each learner at their level to reconstruct knowledge through discussion, reflection, and activity. Higher-level content learning does not occur through imitation by the less knowledgeable learner (Bandura, 1962). However, all learners within the community may develop social and criterial skills (Nelson, 1996) through imitation. This makes the role of the instructor as facilitator and knowledge expert important in guiding learners into appropriate behaviors within the specialization that promote learning and not simply imitation.

What is common to both branches of constructivism for the learning process to continue is active participation by learners, building on what they already know and using it to construct new knowledge (Hausfather, 2001). Learners will use the activity to develop a framework for future application to unstructured problems. A component of

collaborative learning is giving learners opportunities to practice the language of the specialized community and explore the culture of that community, socially and cognitively. Incorporating constructivist theory into the collaborative environment helps educators develop activities that will simulate the professional community with lower risk to the learner.

Principles and Strategies

The primary principle in collaborative learning is that meaningful communication promotes learning (Bruffee, 1999). Teachers can best facilitate this communication by using small groups. The groups have freedom to approach the task the way they feel will provide them with the maximum learning return. Tinzmann et al. (1990) suggested there are four key characteristics to promote meaningful communication in a collaborative classroom.

The first characteristic is a shared knowledge among teachers and students. "In traditional classrooms, the dominant metaphor for teaching is the teacher as information giver; knowledge flows only one way from teacher to student." (Tinzmann et al., 1990, p. 2) In contrast, the metaphor for collaborative classrooms is shared knowledge. The teacher has vital knowledge about content, skills, and instruction, and still provides that information to students. However, collaborative teachers also value and build upon the knowledge, personal experiences, language, strategies, and culture that students bring to the learning situation. The teacher uses the foundational knowledge of the course by encouraging learners to find solutions to non-foundational problems, creating cognitively interdependent learning situations.

The second characteristic or strategy is the shared authority among teachers and students (Tinzmann et al., 1990). Collaborative teachers differ in that they invite students to set specific goals within the topic framework, provide options for activities and assignments that capture different student interests and goals, and encourage students to assess what they learn. Collaborative teachers encourage students' use of their own knowledge, ensure that students share their knowledge and their learning strategies, treat each other respectfully, and focus on high levels of understanding. They help students listen to diverse opinions, support knowledge claims with evidence, engage in critical and creative thinking, and participate in open and meaningful dialogue. Each of these activities incorporates various forms of communication at varying levels of difficulty therefore increasing the learners' social interdependency exposure. Students will be challenged to communicate a learning strategy while practicing skills of negotiation, conflict resolution, and argument.

Tinzmann et al. (1990) proposed a third characteristic or strategy to encourage meaningful communication in the collaborative learning environment; teachers are mediators instead of the dispensers of knowledge.

> As knowledge and authority are shared among teachers and students, the role of the teacher increasingly emphasizes mediated learning. Successful mediation helps students connect new information to their experiences and to learning in other areas, helps students figure out what to do when they are struggling through

> a concept, and helps them learn how to learn. Above all, the teacher as mediator adjusts the level of information and support to maximize the ability to take responsibility for learning. (p. 2)

A teacher functioning as mediator, in contrast to the authority, is another important principle of collaborative learning. When the instructor takes on the role of mediator versus the role of sole authority students are provided opportunities to develop ways to communicate their understanding or lack of understanding within their classroom community by sharing what they know and considering what others know on the given topic. Students then must develop a framework for completing the task appropriately and in a timely manner. Further, the members of the community must use their knowledge of basic concepts from the specialization to construct solutions to differing and unstructured problems.

Finally, the use of heterogeneous groups is important for a well-developed collaborative environment as noted by Tinzmann et al. (1990)

> A critical characteristic of collaborative classrooms is that students are not segregated according to supposed ability, achievement, interests, or any other characteristic. Segregation seriously weakens collaboration and impoverishes the classroom by depriving all students of opportunities to learn from and with each other. Students we might label unsuccessful in a traditional classroom learn from "brighter" students, but, more importantly, the so-called brighter students have

> just as much to learn from their average peers. Teachers beginning to teach collaboratively often express delight when they observe the insights revealed by their supposedly weaker students. (p. 3)

Based on these four principles or strategies, the roles of the learner and the teacher change in the collaborative classroom. These changes will encourage communication from peer-to-peer and from teacher to student by creating both cognitive and social interdependency.

Role of the Teacher

Most educators feel a sense of responsibility for delivery of the content in their classrooms. However, educators using collaborative learning will need to change their view of the role of the teacher in a collaborative classroom. Students and teacher now share the burden and responsibility of covering the content. As MacGregor (1992) suggested the perceived loss of control over content can be a bit unnerving at the outset of collaborative learning. However, the instructor does not give up the development of the structure of the learning environment (Miller, Groccia, & Wilkes, 1996). It is important that the instructor learn to develop a structure of activities that promote learning in a collaborative classroom (Barkley et al., 2005).

Rebori (2000) proposed the educator new to collaborative learning develop a plan for creating an environment that is conducive to collaborative learning. First, a set of guidelines that learners will follow for conduct within a group may help to alleviate conflict or confusion. In addition, encouraging groups to develop a framework from which to work will help students know when to push for those arguments they are

passionate about and find a common agreement for those arguments that they may find are not of great importance to them. Collaborative learning is not about one or more students having decision-making authority and persuading other students; rather it is an opportunity for discussion to develop and alter previous assumptions and knowledge to create a new understanding. The process of collaboration focuses on negotiation, adapting current knowledge, practicing being in the specialization, and examining theories in use versus espoused theories in light of a given topic.

Davis (1993) discussed methods for developing groups, a challenge that can be intimidating for educators, and one that educators complain about most often. She suggests the educator create tasks that require interdependence (p. 2). Making the group work relevant and creating assignments that fit the students' skills and abilities (p. 2) at the appropriate level are two additional suggestions. She also advises that educators structure assignments so that equitable division of the work is possible and some level of friendly competition between groups is involved.

There is a variety of ways to determine how to form the groups. Scholars suggest trying several and then sticking with a few that works best for the teacher and seem compatible with their teaching style (Angelo & Cross, 1993; Gregory & Chapman, 2002; Materna, 2007; Silberman, 1996). They further encourage starting small and work slowly into developing collaborative learning activities. Setting up an instructor learning circle within the institution for faculty-to-faculty discussion and support may also helpful.

The intended role of the teacher is to facilitate, model, and coach students as the knowledge expert not the knowledge deliverer (Tinzmann et al., 1990). Barkley et al.,

(2005) agreed with Davis (1993) on the design of learning tasks in that they must promote interdependence. Collaborative learning tasks should be structured so that they are appropriate for what is to be learned, at a level that matches the students' abilities, and require some measure of individual accountability. Structuring learning tasks in a collaborative environment will require significantly more time than preparing a lecture. Preparation of a course centers on activities that will engage learners by promoting activity, interdependence, and responsibility in learning (Fink, 2003).

Role of the Student

Students may be unfamiliar, and even uncomfortable, with the idea that they must be responsible for their own learning. They will also need guidance on their conduct within a group. An explanation by the instructor of the theory and purpose of collaboration and a gradual lessening of restrictions on assignments helps reduce resistance to learning. Introduction of the learner to the principles of collaborative learning will be important to success, according to Bruffee (1999).

Students may have concerns about assessing the work of their peers, and there may be initial concern that this is the teacher's job, not theirs (Crowe & Pemberton, 2002). Additionally, students have immediate concerns other students will not perform and that they will carry the load of the work, a situation referred to as social slacking. These are common reasons why students may show resistance when they are unfamiliar with collaborative learning or when they have experienced poor collaborative structures in the past. Educators should also prepare themselves for this type of resistance, and further, will need to accept some level of social slacking. Perceptive educators will turn

this resistance into opportunities to help learners understand and deal with these types of behaviors in other environments, for instance, the workplace.

In collaborative learning students are responsible to set goals, both short term and long term (Tinzmann et al., 1990). They must also learn to monitor these goals and reevaluate their effectiveness along with continued validity. They also gain skill in developing tasks appropriate for learning the material. As they work to complete the assignment, they again must reevaluate if the tasks are useful or if development of a new set of tasks is necessary. They learn critical skills in finding information, applying it appropriately, and effectively resolving a problem. In short, they learn how to learn. Finally, they take on the role of assessment, a process wherein the facilitator becomes crucial in coaching students how to become effective at assessing their peers.

Students are the primary stakeholders in collaborative learning environments. They must leave the educational arena with skills that will allow them to integrate quickly into a new specialization. Generally, these specializations are changing and reshaping with changes in the economic environment and demands by consumers. Graduates must have the skills to change and change quickly; therefore, they must leave the educational institution with an ability to adapt their newly gained knowledge to a specialization that has likely already changed the way it uses the technical skills of the profession (Marx, 2006). Likewise, many learners will move into specializations that use guidelines set forth by government agencies, and these guidelines can be extensive. Again, they must understand how to gather the appropriate information and apply it to the current situation (Albrecht & Sack, 2000; AAA, 1986, Nelson, 1996).

Application and Concerns

Research has shown that some disciplines are resistant to the use of collaborative learning (Albrecht & Sack, 2000; Borthick et al., 2003; Panitz, n.d.), and observations by this researcher support this finding. The thought may be that these courses do not lend themselves to discussion due to the focus on personal perceptions of learners and social issues that usually do not have a definitive solution. In contrast, traditional thought was that the foundational specialties focus on concrete ideas based on rules and principles that are external to the learner and therefore are not constructed by the learner, but are transferred to the learner by the knowledge expert or authority on the subject (Bruffee, 1999). The foundational courses are beginning to see the value of collaborative learning, but they struggle with accepting it as a valid assessment technique, especially when applied to exams. Recently educators have conducted research related directly to specialties such as, accounting (Davis & Dudley, 1997; Debessay, 2004; Gammie & Matson, 2007; Hite, 1996), computer science (Null, 1997; Simkin, 2005), and chemistry (Brown & Blackburn, 1999), law (Haddock, 2001), and in the medical disciplines (Cortright, Collins, Rodenbaugh, & DiCarlo, 2003; Meseke, Nafziger, & Meseke, 2008; Mitchell & Melton, 2003). They have shown favorable results in increased grades, student engagement through discussion and argument, and the students' overall positive feeling about the course.

Educators do have various concerns with collaborative learning. They express concern over how to assess students and assign individual grades on collaborative assignments as noted by the Enerson, Johnson, Milner, and Plank (1997). Determining

what assignments to make collaborative and knowing which ones will provide the best learning benefit is also a concern. Other faculty express considerable doubt that collaboration is an appropriate method for testing, although the limited research supports benefits of collaborative exams (Haddock, 2001).

Assessment in collaborative learning and the assigning of individual grades will continue to shape the future of this method of instruction. Those educators in the foundational courses often do not see assessment tools in a collaborative environment as valid and acceptable as measurement of student understanding of material. This may be true because these specializations often culminate in a certifying exam, for example accountants take an exam to designate them as a certified public accountant, nurses take board exams, and attorneys take a bar exam. All of these certifying exams and the success of the exam taker rely on individual performance and knowledge of the material on the exam.

A concern for teachers in collaborative learning is giving up perceived control over learning of content and the loss of time talking to the class (Davis, 1993). Proponents of collaborative learning provide various methods to address this concern. Educators may become more comfortable with giving up lecture time after researching and practicing some of these methods. Davis suggested that students develop a higher level of reasoning and critical thinking skills when working collaboratively, therefore, less extensive coverage by the instructor is required.

The most common inclusion of collaboration is in the online learning environment. This may be due to the isolation that many learners feel in the online

environment (Bruffee, 1999). Developing methods of collaboration for online learners has positive effects on the retention rate and success of online learners (Clark, 2000). Developing collaborative activities that learners will actively participate in will lessen the isolation while still requiring cognitive and social interdependence within this unique community.

Current learners now have the advantage of an interactive world wide web. The recent explosion of web-related tools facilitates the development of collaboration activities for the online classroom. Instructors and learners can now communicate in a variety of ways with weblogs, wikis, rich site summary (RSS), podcasts, and social networking sites (Richardson, 2006) and the onslaught of numerous Web 2.0 applications (Elliott, 2008). Barkley et al. (2005) provided many examples of incorporating active and collaborative assessments that would allow learners to practice criterial skills (Nelson, 1996) and critical thinking. Colleges and universities all over the world are only beginning to understand the impact that virtual learning has on higher education.

Although the use of the internet, coupled with a specialization, is in high demand by learners today, (Elliot, 2008) unfortunately faculty cannot simply place instructional materials online and hope that learners will learn. Burke (2001) states this about the quality of the online course:

> If technology is used to support distance-learning classes, it must be done in a way that, at minimum, equals quality of face-to-face education. One way to help accomplish such an objective is to find ways to integrate collaborative learning projects successfully into the distance-learning environment. (p. 16)

Providing successful online learning opportunities is generally more time consuming, requires some creativity to move face-to-face materials into an online format, and requires some understanding of instructional design appropriate for online learners (Boettcher & Conrad, 2004).

This online environment, although an excellent tool, creates a unique set of issues for instructors and students. Faculty have more difficulty in knowing how to grade online assessments (Swan, Shen, & Hiltz, 2006), they are concerned that the student is actually the one completing the assessment or summative evaluation (Elliot, 2008), and they lose the ability to make physical observations of learners that have provided cues to the learning process. Additionally, learners may take an online course out of convenience when they do not possess the aptitude and study skills needed to be in that environment. Students may lack skills in technology that the instructor may not be aware of and this could contribute to lack of retention or success in the course.

Even with these issues, online learning will be a growing and prominent area of higher education (Elliott, 2008; Marx, 2006). Educators will likely need to be able to provide, at some level, learning opportunities within this environment. Practitioners have understood for more than 10 years that graduates need to be able to use technology with ease, use the internet for research and communication, and understand the proper social skills for navigating the virtual world.

The combination of online learning and collaborative learning creates a unique learning experience. As Ma (2009) noted, the combination of the two encourages higher-order thinking and reasoning. As has been discussed, learning takes place when there is

learner engagement. This is true for the online environment as well. When learners are engaged in collaborative assessment in the online environment, the need for activities that create social and cognitive interdependency is greater because learner isolation is already a tendency in this delivery method. The online environment allows learners to practice criterial skills (Nelson, 1996) in creatively different ways than in the face-to-face environment (Ma, 2009). The opportunities to increase skill in communication, problem solving, and technology is inherent when course activities require social interdependence (Kreijins & Kirschner, 2002). Learners who may not have expressed themselves in a face-to-face environment may now feel comfortable to present and contribute to the learning process, enriching cognitive interdependence (Shellens & Valcke, 2005). In her study, Ma concluded,

> this study confirmed that there was a positive correlation between the quality of collaborative process engaged by groups and the quality of cognitive skills fostered. High levels of social interaction and collaboration contributed to the establishment of a community of learning, nurturing a space for fostering higher order thinking through co-creation of knowledge processes. (p. 164)

There is a mix of research results on the benefits of collaboration in promoting diversity within the learning environment. Lim and Zhong (2005) reported positive results in promoting diversity. In addition, students felt that they received a richer learning experience with groups that are culturally diverse and demonstrated a leadership structure. The study found that learners did not report positive experiences with small homogenous groups. Terenzini, et al (2001) did see some curvilinear effect on diversity

in collaborative environments. The research in this area is limited and primarily based in K-12. Promotion of diverse ideas and ways of approaching problems allows learners to develop a broader base of understanding, helping learners to seek creative and alternative solutions.

Student resistance to collaboration is of concern to educators (Tinzmann et al., 1990). Generally, traditional college students find the idea of collaboration acceptable and familiar. However, many non-traditional students are more familiar with the traditional lecture environments and are uncomfortable and resistant to working in a new way (Crowe & Pemberton, 2000, March). Davis (1993) noted the most common arguments students make against collaboration are that they do not like it; they do not want to do another student's work if that student is not participating at an expected level, and they do not have time to meet with their group members outside of class. Further, they consider taking a collaborative exam as cheating and fear that they will not have an appropriate understanding of the material at the completion of the course.

Assessment

Formative

The distinction should be made here between assessment and evaluation. Assessment, for this study was considered to be formative in nature, where students are provided with opportunities and resources to determine how well they are learning the content of the course. Assessments are designed to promote learning and identify where learning gaps exist. In educational practice, the word assessment often encompasses

evaluation of programs and courses, assigning homework, quizzes, and labs and giving exams. It is not used in such a general manner for this study.

> Formative assessments—ongoing assessments designed to make students' thinking visible to both teachers and students—are essential. They permit the teacher to grasp the students' preconceptions, understand where the students are in the "developmental corridor" from informal to formal thinking, and design instruction accordingly. In the assessment-centered classroom environment, formative assessments help both teachers and students monitor progress. (National Research Council, 2000, p. 24)

Summative evaluations, testing of an individual learner's knowledge of course content at the end of the course, were not included in the meaning of assessment for this study. However, it is an important component of evaluation of the learners, instructor, and the foundational materials of the course.

McKeachie (1986), referring to testing, reports that:

> ...if teachers say that they are concerned about developing skills and strategies for further learning and problem solving and that they hope to help students develop cognitive structures that will form a foundation for continued learning and then give tests that require memory of individual facts, definitions, and isolated information, students will memorize the facts, definitions, and information on which they expect to be tested. In doing so they will use memorization, repetition, and other learning strategies unlikely to be useful for achieving the higher order cognitive objectives we have proclaimed. (p. 76)

Memorization of basic facts in a given discipline does not equal learning of the concepts behind the facts. Nor does it allow learners to think critically about the tenets of a discipline. Often, learners are not able to recall the less repeated aspects of the discipline foundations once they have left the course and moved into advanced courses or into the profession. Frequent review of the concepts is necessary because learners cannot immediately apply them to various and changing settings of the discipline or across disciplines. Learners have no idea how the memorized facts fit into the whole picture or how the supporting concepts provide the framework for decision-making. Learners also do not know how to adapt these memorized facts to real world situations that often differ from the structure practiced in the textbook.

However, learners within the classroom see testing as a high stakes evaluation of knowledge and prepare for them differently than they do other types of assessment, for instance homework and quizzes. Instructors place higher importance on exams by assigning greater weight to these assessments and repeatedly remind learners of important concepts and topics that will be on the exam. Students are keenly aware of this and design their study habits around being successful on these evaluations.

Instructors generally set up a traditional exam environment that learners have come to understand as different from the day-to-day instructional environment, and they learn quickly that expectations are higher. Learners understand the importance of success on these high stakes assignments and take them more seriously than the less weighted instructional assessments (Bloom, 2006). The traditional view of an exam is summative, requiring the recall of a large body of concepts leading students to prepare for them by

memorizing facts, definitions, and rules (McKeachie, Pintrich, Lin, & Smith, 1986). Exams are less commonly viewed as formative or part of the ongoing learning process where learners discover, during the testing process, what they do not know and acquire that knowledge during the assessment (Hargreaves, 2007).

Instructors may argue that a test is given to determine what a student has or has not learned. However, most instructors would also say they want students to become critical thinkers, better problem solvers, and apply basic concepts to broader and different contexts. If this is true, and instructors want the latter, then students should be tested in a manner that will allow them to learn and apply foundational material in various ways, the use of both formative assessment and summative evaluations means that they will continue to learn while being tested on knowledge of the foundations. In essence, learners will not successfully problem solve and critically think if they lack understanding of the basics, therefore, some amount of testing of the concepts should be built into the formative assessment.

Collaborative Testing

Bruffee (1999) argued that applying collaboration to testing requires the participant to take it seriously because of the correlation between testing and significance, but many educators still argue that collaborative testing is acceptable cheating. Collaborative testing, especially, brings to light several ethical considerations that warrant more research. A primary consideration for both learner and educator is whether collaborative testing prevents cheating or causes it. This, again, depends on the type of assessment, summative or formative. A summative evaluation, given collaboratively,

may promote cheating and slacking whereas a formative assessment will likely promote continued learning and retention of concepts (Toppins, 1989). Swan et al. (2006) found that when preparing for collaborative exams students moved away from what they termed as surface learning and reported deeper learning of the material. If the purpose of the assessment were in reality evaluation of what the learner knows individually then collaborative exams would not be the best choice for testing.

In Marx's (2006) discussion of 21st century educational trends, specifically human ingenuity, he repeatedly states that learners will require opportunities for collaboration in the learning environment if they are to be successful in the future workplace. Collaboration as an instructional method has gained significant acceptance in the last ten years in the postsecondary and adult educational environment. Instructors have come to understand the value of including active and collaborative activities to enhance critical thinking, problem solving, and provide learners with opportunities to practice criterial skills (Nelson, 1996) of the profession. However, there has been reluctance to include collaboration when testing as a means of evaluating student learning.

The research on collaborative testing in adult education is limited. However, it has been shown to be an effective method in the elementary and secondary environment (Billington, 1994; Fuchs et al., 1998). There are several important studies for various demographics of students on the value of collaborative learning, and these studies support the positive effects of collaborative testing (Chickering & Gamson, 1991; Gokhale, 1995; Slavin, 1980). These studies provide support for current and future research in collaborative testing.

As discussed previously, collaborative testing is generally more acceptable in what educators call the non-foundational courses; examples are English, social sciences, and history. This form of testing allows learners to discuss social issues, reshape their thinking, and look at issues from various perspectives. However, the acceptance of collaborative testing has not garnered the same approval in the foundational courses. These courses, which include statistics, accounting, chemistry, engineering, computer science, and nursing, usually find a foundation in a set of rules or guidelines that learners must follow. These rules and guidelines may be the foundation for advanced courses or success on a certifying exam and they are often extensive. Learners often resort to memorization techniques for successful completion of the course. Instructors in these courses tend to teach them in a traditional lecture style.

Arguments against collaborative testing include students not coming prepared to take the exam, though during observation of collaborative testing researchers did not report the majority of learners coming to the test unprepared (Duncan & Dick, 2000; Lusk & Conklin, 2002; Morgan, 2000; Muir & Tracy, 1999; Russo & Warren, 1999). Instead, they came more prepared citing they did not want to have a negative effect on group members.

An ethical concern is the fairness of assigning an individual grade based on work completed as a group. There is a concern that learners will rely on other learners for all of their answers and therefore never really learn the material. One consideration is assigning grades individually versus one grade for all members of the group. Providing some

measure of peer assessment that has the potential for negative effect to social slackers may also provide motivation for participation and help high performing students to feel more comfortable (Slusser, 2004, August).

A consideration of all instructors when incorporating collaborative testing is the purpose of the testing. A good assessment design will focus on what the instructor is trying to measure, and that will mean striking a good balance of formative assessment or summative evaluation (Gronlund, 2006). If the instructor's goal is to test an individual learner's recall of basic knowledge then collaborative testing may not be appropriate. However, if the instructor wishes to provide additional learning experiences for the student to fill gaps in knowledge and develop specific criterial skills (Nelson, 1996) then collaborative testing may provide those opportunities. A discussion of several key studies specific to group or collaborative testing and their conclusions follow.

Simkin (2005) studied collaborative testing in the information technology (IT) discipline, usually considered a foundational course. In his rationale for collaborative testing, he describes observations from several disciplines, listing increased motivation, discussion of concepts, and learners functioning as teachers as some of the benefits of collaborative testing. IT and similar foundational course discipline practitioners (accounting and advertising) work in teams and need to develop teamwork skills to be successful in the profession. Collaborative testing contributes to this. Simkin did not address the theoretical perspective of the IT discipline, but it is obvious that while Simkin's findings concerning collaborative testing were positive, further study is

warranted. He noted a positive difference in attitude and engagement of students when using collaborative testing methods and significant improvement in scores.

Breedlove, Burkett, and Winfield (2004) approached the study of collaborative testing from a general perspective. The experiment and findings were very general and applicable to many disciplines, although the authors are in the sociology discipline. The study hypothesized that collaborative testing would have a positive impact on test performance when used on basic concept and knowledge questions. They did not believe that collaborative testing would have a positive association with questions on theory and application. Their study conclusions supported their hypotheses, but they suggested that collaborative testing might be more beneficial when combined with collaborative learning activities throughout the course. The research showed statistically better scores on concept type questions but not on theory type questions. "To the extent that theory questions represent a higher level of abstraction and answering theory questions requires higher cognitive process." (p. 40)

Bloom (2006) suggested that collaborative testing provides further opportunities for students to learn material. This study compared Introduction to Theatre exams over two semesters. In the first semester, learners took the exams the first time individually and then the second time, during the same class period, with the aid of books and notes. To isolate collaboration, in the second semester students took the exam individually on the first attempt and then were allowed to collaborate, also using books and notes on the second attempt, again during the same class period.

Using a *t*-test, the results of this study showed that in the semester where students collaborated on the second attempt, scores were significantly higher (Bloom, 2006). Scores for Exam 1 of each semester were reported as being significantly higher with 55% of students scoring 100% on the exam in the collaborative semester versus only 11.8% of students scoring 100% in the non-collaborative semester. Bloom did not state in the study if students were taking the same exam on the first and second attempt. She noted her observation of increased student engagement as "dynamic and lively" in the collaborative second attempt. (p.4)

Studies conducted by Lusk and Conklin (2002) and Mitchell and Melton (2003), both in the nursing profession, found similar results in improvement of grades when using collaborative testing. These studies also reported observation of active engagement by learners during the process and practicing of criterial skills (Nelson, 1996). Learners reported enjoying the experience and feeling as though they had retained more information in contrast to individual exams.

Additionally, Bloom's (2006) study found through classroom observation and learner comments on course evaluation forms that learners enjoyed the collaborative alternative. Observations during the exam showed active and engaged learning happening through discussion, defending of answers, and explaining reasoning for decisions on final answers. Learning was continuing to happen well into the formal assessment period. Learning the material, regardless of when it happens, is what instructors ultimately want for students.

In 2003, Cortright et al., and DiCarlo measured student retention of concepts following collaborative testing. The researchers conducted their study in a college elementary physiology course by dividing a class into two groups. On the first exam, all learners took the exam individually. Immediately after the first exam, the first group was divided into smaller groups that worked to answer a subset of questions from Exam I collaboratively.

To determine the effect of collaboration, on the second exam students completed the exam individually and additionally answered a set of questions from Exam I individually. The collaborative method was used for the second exam, this time allowing the second group to work collaboratively on a subset of questions from Exam II. Following the same random crossover design, all learners answer the subset of questions from Exam II individually on Exam III. Using appropriate statistical measures, the researchers found that learners who took both parts of the exam individually did not retain concepts, and in fact showed a significant reduction in retention. In contrast, learners showed a statistically significant improvement in retention when allowed to work collaboratively. Again, this study focused on student learning in the exam process.

The question of retention is a consideration for the value of collaborative testing. Educators also find value in continued learning in the testing process using formative assessment. Rao, Collins, and DiCarlo's (2002) study conducted in various courses within a post baccalaureate medical program found that collaborative testing does promote continued learning of the material. Hite's (1999) research in an Individual Income Tax course also found a positive effect on retention when using group exams.

There have been various methods used, in addition to those cited above, to determine the positive effects of collaborative testing. Hite (1999) used control and experimental groups in two different semesters. Shindler (2002, April) used six groups at two different institutions. Crannell (1999) applied collaborative assessment to oral take-home exams. Slusser's (2004, August) evaluation was on quizzes whereas Muir and Tracy's (1999) study found positive effects for student attitudes, retention, and continued learning using essay exams.

Educational researchers will find it necessary to conduct further study as learners push educators to provide opportunities for finding personal meaning (Marx, 2006) and immediate application of a subject within the walls of the classroom. Accounting professionals have made it clear that new graduates need to be highly flexible, have developed interpersonal skills as well as technical skills unique to the profession, but more importantly, they need to have had opportunities to practice criterial skills (Nelson, 1996) to be successful accountants.

Collaborative testing in itself could become an acceptable form of assessment through additional research and study especially in the more traditionally taught foundational courses. Educators agree that collaborative learning provides more meaning and works toward fulfilling the desire for learners to create ideas (Marx, 2006) and then expand on them through discussion and practice within a diverse group (Bruffee, 1999; Hargreaves, 2007; Hite, 1996; Stearns, 1996). In many of the trends discussed by Marx collaboration is a key component as it is also a highly sought after skill in most

professions. Educators, to be effective in addressing these trends in the learning environment and the profession, will find collaborative learning and testing useful.

Conclusion

The short-term implications of collaborative learning methods are that learners begin to develop and use higher order thinking skills as they learn the specialization norms in the classroom community. As learners develop these skills they begin to understand the importance of considering how well they are prepared for the future. Learners themselves can assess current trends and adapt, as well as learn skills to scan the environment (Marx, 2006) and become leaders in addressing and preparing for new trends.

Collaborative learning methods provide a forum for learners to bring what they already know to the community and then question and adapt their thinking by examining and evaluating their current knowledge. It requires a thoughtful consideration of their peer's ideas, both diverse and multi-generational peers. Through discussion and active learning, the learner will practice various adaptability, teambuilding, and negotiation skills. The implication for the long-term is that learners will be able to begin their careers with some level of criterial skills (Nelson, 1996) and be able to adapt those skills as a new trend is developed or current trends pick up speed. They will be prepared and able to recognize the need to develop skills to sustain them through the trend.

The trend in relation to collaborative learning is the shift from traditional, lecture-based college classrooms to student-centered classrooms. Educators have begun to see

the importance of engaging students in learning by including activities that require students to use a broader range of skills, especially criterial skills (Nelson, 1996) of the profession, in addition to the technical skills of the specialization.

CHAPTER 3. METHODOLOGY

Purpose of the Study

The first objective of this mixed methods study (Creswell, 2008) was to determine the impact of collaborative testing on summative final exam scores. A further objective was to gather feedback on how learners perceived formative assessment collaborative exams influenced that assessment score. A final objective was to gather feedback on how the learners and the instructor perceived learners are practicing criterial skills (Nelson, 1996) of the accounting profession during formative assessment collaborative exams.

Research Questions/Hypothesis

Primary Research Question. What is the impact of collaborative testing on summative final exam scores?

Null Hypothesis. There is no difference on overall final exam scores between students using collaborative testing versus traditional testing.

Secondary Research Questions.

1. How do students perceive the influence of collaborative testing on formative assessments?

2. How do learners perceive they are practicing accounting criterial skills (Nelson, 1996) during collaborative exams?
3. How does the instructor perceive practicing of accounting criterial skills (Nelson, 1996), by learners, during collaborative exams?

Research Design

This mixed methods study (Creswell, 2008) addressed the influence of collaborative testing on learning using a quasi-experimental approach. This study used a modified embedded mixed method design in which the qualitative and quantitative data, associated with the secondary questions, provided a supportive role in a study based primarily on the quantitative data set associated with the primary question. This study used a pre and posttest, a departmental final exam, given as a traditional comprehensive exam in two sections of Accounting Principles I, to test the theory of influence on learning that predicts collaborative testing positively influenced final exam grades.

Learning is often equated with success on a summative evaluation. Although this researcher does not adhere to that belief, it is understood that many instructors do. Therefore, the need for a quantitative aspect to this study was necessary to provide data on the impact of collaborative formative testing on a summative final exam. The selection of an embedded mixed method design (Creswell, 2008) supported this study best and enhanced credibility among the intended audience. This study data is primarily quantitative in nature. However, after extensive review of studies on collaborative learning, and more specifically, collaborative testing, it was determined that quantitative

data alone could not fully answer the question of the impact formative collaborative testing had on the summative final exam scores (Creswell, 2008). The selection of a quasi-experimental design over an experimental design was required because learners could not be randomly selected for each section. Learners self-registered for this college course several months in advance of the start of this study. Further, there was some limitation placed on the randomization of collaborative groups. Although the instructor attempted to make the collaborative testing groups random, the desire to have learners at various abilities within the group, group size, class size, and primarily, learner's schedules placed limits here.

Participants and Site

This study was conducted during the fall 2009 term at a large upper Midwest community college servicing a tri-county area. The college housed an Accounting Discipline within the Business and Information Technology Division. An Associate in Business Studies degree was offered with a Certificate of Achievement and Advanced Certificates in Accounting. The department was comprised of four full-time faculty members, this researcher being one of those members. The department also had approximately 15 adjunct instructors.

Three of the four full-time members of the department held tenure track positions, with this researcher and one other member being tenured. All full time members have been practitioners. All members taught, at minimum, one principles course each

semester. Adjunct instructors were primarily practitioners within the accounting profession.

Students at this college self-registered for courses. Courses within the accounting discipline had a seat capacity of 25 students. Individual instructors had the right to allow overloads into the course at their discretion. Otherwise, instructors did not control students registering for this course. Courses had prerequisites that were computer enforced at the college.

The course used in this study was Accounting Principles I; this was the first course in the accounting program. This course had two prerequisites, scores on an entrance exam of math equivalent to pre-algebra and a reading level equivalent to $9^{th}/10^{th}$ grade. These prerequisites were waived only in rare instances of verifiable education or work experience substitution. Learners in this course may have been in the accounting program, but a high percentage was non-majors, taking the course as a requirement in another program.

Instructors had academic freedom to teach the course in the way they believed facilitated learning and fit their teaching style. There were three requirements of all instructors for this course. Students were to complete a practice set, comprehensive problem, or 2 to 3 small research cases, students were required to use the online homework system that was packaged with the textbook, and students were required to take a traditional comprehensive final exam that was written by the four full time faculty. All instructors used the same textbook and were required to provide instruction to students on a specific set of objectives within required chapters.

The two specific sections, taught by this researcher for this study, were in an online format. Students did not attend an orientation on campus. They completed a series of first day activities that was designed to help the instructor understand their ability to navigate the homework management system, the textbook homework site, and general use of a computer. The instructor, to gauge learning style, student understanding of expectations, ability to use technology, and create a collaborative atmosphere from the beginning of the semester, created this series of activities.

Students in these two sections were required to come to campus only for the pretest, the three chapter exams, and the comprehensive final exam, which was the posttest. The instructor maintained online office hours as well as campus office hours. All students in all courses taught by this instructor could use the online, campus, or combination of office hours for assistance. Additionally, the instructor encouraged all students to seek further assistance from the institution's Tutoring Center, peers, and community practitioners.

Both sections of this course began and ended on the same date. The instructional methods used in both sections were the same. All due dates for assessments and evaluations were the same. The instructor used a variety of instructional methods that promoted and assessed learning. These methods were assigned varying degrees of points to encourage learner participation. The same grading scale was used for both sections of the course. The two sections were the same with the exception of chapter exams. The control section took traditional chapter exams and the treatment section took collaborative chapter exams.

Process

Learners were instructed to enter the homework management system for their course. Upon logging onto this site, they saw a survey explaining what to expect in the online course. After completing the survey, they were directed to a demographic survey to be used in this study (Appendix B and C). Additionally, they were instructed to complete learning, motivational, engagement, and directional style inventories that was used to develop an overall learner picture of each section of this course and provided insight for this study. Students then followed the syllabus and assignment schedule for each section.

The control section was ACC 211– Fall Online I, Principles of Accounting I, with enrollment of 25. The treatment section was ACC – 211 Fall Online II, Principles of Accounting I, with enrollment of 25. The first task for learners, after the initial first day activities, was the completion of a pretest to provide a comparison of the two section's initial understanding of foundational accounting concepts. Additionally, the pretest provided a means for the instructor to assign collaborative testing groups in the treatment section, for the first formative collaborative test. The learners were asked to come to campus by the end of the first week of classes to complete this pretest in the institution's Academic Testing Center.

The pretest consisted of 50 multiple-choice questions that were used to determine a learner's ability to recall foundational information from this course. The exam answers were completed on a Scantron© form then processed and summarized using a reader by

the institution's Office of Information Technology and then returned to the instructor. The pretest was compared to the posttest to evaluate significant differences in the mean of the scores for the two sections.

When learners completed the formative assessments on chapters 1 thru 4, they completed a concluding formative assessment in the form of a traditional exam for the control section or a collaborative exam for the treatment section, Exam I.

Exam I asked the same questions, in the same order, and each question had the same point value for both sections. Learners in both sections had 2.5 hours to complete the exam. This time was chosen because it is equivalent to one class meeting time in face-to-face delivery. Exam questions consisted of foundational and theory type questions. The exam format included a mix of multiple choice, short essay, fill-in-the blank, matching, and problems.

Learners in each section had a published one-week window to complete the exam. Learners in the control group completed the exam in the institution's testing center in a traditional format. Learners in the treatment section worked within their collaborative groups to set a date with the instructor to complete their exam. The instructor provided an area for the treatment section groups where the learners worked and they were observed by the instructor. The instructor observed no more than three groups at a time.

The treatment section was assigned to groups, as much as possible, based on the institution's A through F grading scale. Learners were assigned to groups of three; however, adjustments had to be made to accommodate participant schedules. Every attempt was made to include participants with an above average, average, and below-

average score, based on the pretest. The assignment of groups was made by placing learners into groups by ranking, scrambling the names; the first name on the list was assigned to group #1, the second to group #2, and so forth.

Neither section was allowed to use any aids when taking the chapter exams, for example, books, notes, completed homework. Both sections completed the chapter exams using the exam package provided and by marking answers on the exam package. All learners used basic calculators that do not store data; the instructor provided these.

An online discussion board, for review, was set up for both sections, however, points were not assigned for this discussion board, and learner participation was voluntarily. The treatment section was notified of the group assignments five days before the exam window opened. These groups had an assigned group discussion board for setting the appointment with the instructor for the exam.

Following the completion of the exam, both sections completed surveys. The purpose of the surveys was to provide support to the quantitative data and a fuller indication of learners' perceptions of learning. The control section completed a survey that polled learners on study techniques and provided feedback on perceived exam success. (Appendix B).

The treatment section completed the same survey with additional questions about the collaborative process (Appendix C). In addition, the treatment section completed a rubric providing feedback on their perception of practicing of criterial skills (Nelson, 1996) (Appendix C). Each group in the treatment section also completed a rubric for their group to gauge perception of practicing of criterial skills (Appendix C). The group

needed to come to a consensus and the survey was not tied to the grade for the exam as it was for qualitative information only. The instructor observed learners in the treatment section and complete a criterial skill rubric for each group (Appendices D and E).

The process described above was used for Exam II to cover chapters 5, 6, & 7 and Exam III to cover chapters 8, 9 & 10. Each previous exam was used to set up new groups for the treatment section using the same criteria and grading scale as for Exam I. This process provided quantitative data to test the hypothesis that there is a difference on overall final exam scores between students using collaborative testing versus traditional testing. It further provided data about students' perceived learning on collaborative exams and the practicing of criterial skills (Nelson, 1996) needed by successful practitioners.

The comprehensive final exam, a summative evaluation, was taken by both sections in the last week of class. The full time faculty of the institution's Accounting Discipline wrote the exam collaboratively. It was policy for all sections of this course to take the exam in the last week of the term. Learners in sections delivered in a face-to-face environment complete the exam in class using a Scantron© form. The final exam was the same exam as the pretest.

The sections included in this study, due to the online format, took the posttest final exam in the institution's testing center. This was a common practice for online and hybrid courses within this discipline. Students in both sections took the exam in a traditional format. Students were allowed to use basic, non-programmable calculators provided by the instructor. Students were allowed 2.5 hours to complete the exam. The

exam was then processed and summarized with the use of a reader by the Office of Information Technology at the institution, they were returned to the instructor.

For the pretest, chapter exams, and final exam posttest all learners received individual grades. All learners in the treatment section turned in individual exam packages and learners were allowed to provide an answer different from the group answer, however, they were asked to provide a rationale for their choice. All exams in the treatment section were graded on an individual basis.

Collection and Analysis of Data

The data was collected by the instructor, who was also the researcher for this study. The pre and posttests were completed using a Scantron© form. The staff at the institution's testing center collected these forms. When the testing window closed the instructor collected the forms, took them to the Office of Information Technology within the institution to have the forms scanned through the reader, which produced summary data of the test by student and by section.

Pretest. The pretest was used to compare initial understanding of foundational accounting concepts between the two sections. Scores on the pretest were used to assign students in the treatment section to collaborative groups. A *t*-test was run to determine if there was a statistically significant difference between the two groups.

Chapter Exams. Quantitative data in the form of the exam scores was used to test the average difference of the paired data. A *t*-test was used in this study, due to the small sample size of the data. This data was used to test the hypothesis that there is a difference

on overall final exam scores between two otherwise same courses when using collaborative testing. After calculation of the mean and standard deviation, the *p*-value determined whether to reject the hypothesis.

The Professional Skills Feedback survey (Appendices B and C) was used to compare the mean of the individual response scores to the mean of the group response scores to see if they were congruent. Qualitative survey data (Appendices B and C) from learners in both the control and treatment sections was collected throughout the semester. After the review of the qualitative data for themes, discussion, as appropriate is included in study results. The results include tables for better understanding of the data.

Posttest. As with the chapter exams, final exam scores were used to test for the average difference of the paired data. A *t*-test was used with this small sample size data. This data was used to test the hypothesis that there is a difference on overall final exam scores between two otherwise same courses when using collaborative testing. After calculation of the mean and standard deviation, the *p*-value determined whether to reject the hypothesis.

Ethical Issues

Confidentiality and Storage of Data

Confidentiality of the all of the information gathered, assessment and evaluation scores followed the Family Education Rights and Protection Act (FERPA). This act prohibits faculty and administration from releasing confidential information about learners and their performance in a course by name, except on a need to know basis. No data in this study reflects learners' names or any identifying information. Learners at this

institution had 25 calendar days to appeal their grade after the due date of grades. Supporting documents for the data, for example, exam packages and Scantron© forms were turned over to the appropriate office professional for shredding as per standard procedure at this institution. Analysis data will be kept in the instructor/researcher's office for a minimum of three years after the publication date of this study.

Informed Consent

Learners were provided with an informed consent document that outlined the purpose of the study and provided them with an opportunity to ask questions. Learners received this form before the start of the course. They were notified that the inclusion of the pretest, chapter exam, posttest, and feedback comments were not required to be included in the study. They were also notified that declining inclusion would not affect their grade. Both the control and the treatment section followed the syllabus for their course as is customary for a college course.

Learners were informed of the method and length of storage in the consent form. Additionally, they were provided with the contact information of the researcher and Capella University if they needed further information about the study. Learners were provided information regarding any risks, benefits, or additional costs. At that time, there were no foreseen risks, benefits, or additional costs to participants, nor were any noted at the conclusion of this study. However, learners would have been informed if any changes in the study arose.

Respect for Persons, Beneficence, and Justice

Respect for Persons. Following the guidelines of the Belmont Report (National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research, 1979), this researcher was careful to respect the autonomy of all persons involved in this study, was mindful of diminished autonomy, and provided protection for those individuals within the guidelines of the institution at which the study was being conducted.

Beneficence. The researcher followed the requirements of the Belmont Report (National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research, 1979) and the guidelines of the institution at which this study was conducted as to beneficence. In conducting this study, the researcher made every effort to maximize the benefits and minimize any possible harm to participants. It was the intent of the researcher, in conducting this study, to "do no harm" to participants.

Justice. Based on the guidelines in the Belmont Report (National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research, 1979) this researcher followed the formulations set out in the report. These formulations are " (1) to each person an equal share, (2) to each person according to individual need, (3) to each person according to individual effort, (4) to each person according to societal contribution, and (5) to each person according to merit. " (p. 6) It was not the intention of this researcher to deny any participant justice or require participants to bear an unnecessary burden in the conduct of this study.

Conclusion

This mixed methods study (Creswell, 2008) looked at the impact of collaborative testing versus individual testing on the final exam scores. The study took place in the fall of 2009 in two Accounting Principles I courses, both delivered in an online format at a large Midwest community college. Further, the study considered the practicing of criterial skills (Nelson, 1996) for the accounting profession during formative assessment collaborative exams.

Appropriate statistical measures were used for the quantitative aspects of this study and reported. Likewise, qualitative data was sorted by themes and presented, when appropriate as observations by the researcher. All participants followed the syllabus for their section and all requirements, with the exception of chapter exams, were the same for both sections. Participants were informed of their participation in the study as appropriate.

CHAPTER 4. DATA COLLECTION AND ANALYSIS

Introduction

The purpose of this mixed methods study (Creswell, 2008) was to find the extent to which collaborative testing improves final exam grades. Additional purposes included examining how collaborative testing provides opportunities to practice the profession of accounting in a broader context and how learners perceived their success on exams and retention of concepts following collaborative testing.

The first objective of the study was to determine the impact of collaborative testing on summative final exam scores. A further objective was to gather feedback on how learners perceived formative assessment collaborative exams influenced that assessment score. A final objective was to gather feedback on how the learners and the instructor perceived learners were practicing criterial skills (Nelson, 1996) of the accounting profession during formative assessment collaborative exams.

Primary Research Question. What is the impact of collaborative testing on summative final exam scores?

Hypothesis. There is a difference on overall final exam scores between students using collaborative testing versus traditional testing.

Secondary Research Questions.

1. How do students perceive the influence of collaborative testing on formative assessments?
2. How do learners perceive they are practicing accounting criterial skills (Nelson, 1996) during collaborative exams?
3. How does the instructor perceive practicing of accounting criterial skills (Nelson, 1996) by learners during collaborative exams?

Data Collection

The Accounting Principles I course is a required course for many programs within the institution. Approximately 15 sections of this course were offered in various formats in the fall of 2009. Enrollment patterns for this course have developed over the last four years with online courses filling first, often with a wait list in excess of 15 students, face-to-face courses tending to fill second, and hybrid or blended courses tending to fill last.

Two sections of this course were offered as online courses; both online sections were used in this study. All students self-registered for both sections of the Accounting Principles I course. Fifty-three students were registered at the start of the semester, between the two sections. Six students chose not to participate in the study. Forty-three students stayed in the course through the pretest.

Before registration began, it was decided that the first section would be the control group and the second section would be the treatment group. The instructor had no previous relationship with registered students before the semester began, and all contact

before the course was strictly related to college and/or course issues. No students were made aware of the testing procedures for either section until the syllabus was provided one week before the semester began. No student asked to be moved from the control section to the treatment section or vice versa.

All data was collected during the fall 2009 semester from these two sections of the course. The researcher who is was also the instructor for both sections collected the data. The data was compiled from the original forms and entered into Microsoft Excel© and SPSS©.

Demographics

All students were asked in the first week of classes to complete a demographic survey, but only 26 students registered in the first week completed the survey. The results are presented in Table 2.

Pretest

The pretest was the accounting discipline departmental final exam from the winter 2009 semester. This departmental final was administered in the last week of the semester to all sections of Accounting Principles I. It consisted of 50 multiple-choice questions. Forty-three students completed the pretest with 37of these students consenting to participate in the study. The purpose of the pretest was to determine if there was a statistically significant difference between the scores of the two sections.

Students in both sections completed the test in the institution's Academic Testing Center, using the test question packet, a pencil, and a scoring sheet. At the conclusion of

the testing window, the testing materials were collected from the testing center. The scoring sheets were processed through the reader in the Office of Information Technology of the institution.

Table 2

Control and Treatment Group Demographics

		Group	
		Control (n=15)	Treatment (n=11)
Gender	Male	6	2
	Female	9	9
Ethnicity	African American		1
	Caucasian (White)	15	10
Age Group	17-22 Not a High School Student	5	3
	23-29	7	3
	30-35		2
	36+	3	3
Program of Study	Arts, Communication, Art, etc.	1	
	Accounting	4	1
	General Business, Marketing Management	9	6
	Social Sciences, Psychology, Sociology, etc		1
	Science, Biology, Chemistry, etc.	1	2
	Not sure, haven't chosen yet		1
Previous accounting experience	None	6	4
	High School Class	1	4
	College Course	7	3
	Work Experience	1	
Concerns about ability to be successful in this course.	Some concern but I think I will be okay	9	7
	It will be fine.	1	1
	No concern I will do fine	3	2
	Concerned I don't think I will do as well as I would like	2	
Understanding of what accounting is.	I am fairly comfortable I know what accounting is about	6	3
	I might know a little about what accounting is about	1	3
	I have a general idea what accounting is about	5	4
	I know what accounting is about	3	1

Due to the small sample size, the appropriate statistical test was determined to be an independent samples *t*-test. Table 3, below provides the mean comparison of the pretest, indicating that neither group performed better or worse than the other group on the pretest., $t(37) = .52$, $p = .60$, using alpha of .05.

Table 3

Mean Comparison of Pretest

Exam	N	*t*	*p*	Difference
Pretest	37	.52	.60	No Statistically Significant Difference

Chapter Exams

For all exams, the control group took their tests in the institution's academic testing center. Students in the control group could schedule a test time during the testing window and operating hours of the testing center that fit their schedule. Upon checking into the testing center, the instructor provided the students a basic calculator, the test questions, and scrap paper. Students were limited to 2.5 hours of testing time.

The treatment section was assigned to groups, as much as possible, based on the College A through F grading scale. The assignments were made by placing learners into groups by grade rank and then scrambling the names within the rank, the first name on the list being assigned to group #1, the second to group #2, and so forth. This categorization was made by using the pretest scores for creating groups for Exam I, Exam I scores for creating groups for Exam II, and Exam II scores for creating groups for Exam III. The instructor then notified the treatment group participants, one week prior to the testing window opening, of their groups assignments.

The assigned testing groups then discussed a time to meet, contacted the instructor to make the appointment, and then met to study, if they chose to do so. The instructor accepted no more than three groups at a time. The instructor observed the treatment testing groups as they worked. The observations were completed from a short distance and while completing uncomplicated tasks so as not to appear intimidating and intrusive to the testing groups.

Exam I: The first exam covered the first four chapters of the material for the course and was worth 200 points. The test consisted of 16 questions, with the first 15 being a mix of conceptual and theory type questions in the form of multiple-choice, true or false, selection, matching, and short essay. The final question made up half of the points on the exam and was a comprehensive problem.

Forty-three students took the first exam, with 41 of those students consenting to allow their results to be used in the study. Using alpha of .05 the independent samples *t*-test indicated that neither group performed better or worse than the other group on Exam I, $t(41) = -1.632$, $p = .11$, with the treatment group scoring 7.74 percentage points higher than the control group, see Table 4 below.

Table 4

Mean Comparison of Chapter Exam I

Exam	N	*t*	*p*	Difference
Exam I	41	-1.63	.11	No Statistically Significant Difference

In an effort to determine if the two groups were performing statistically the same throughout the semester, analysis was completed on each chapter exam. In an analysis of

the individual questions on Exam I, no questions were found to have a significant statistical difference between groups, although two had statistically marginally significant differences, one of which was the integrated problem, and in both instances the treatment group scored higher. Students in both groups performed statistically the same on the exam. It is important to note that six students in the control group did not complete the comprehensive problem, whereas all students in the treatment group completed the entire comprehensive problem. Table 5 provides a breakdown of the exam by question type with a comparison of the group means using an independent samples *t*-test with an alpha of .05.

In addition to completion of the exam questions, both groups were asked to complete a Participant Exam Feedback survey, (Appendix B for control group surveys and Appendix C for treatment group surveys) asking about testing preferences. The survey was completed immediately after taking the exam. The intention of the survey was to solicit information on how students felt about the exam and gather information about preparation, study aids, and testing preferences. The survey was given to gather quantitative and qualitative data to support the idea that students would prefer collaborative methods when testing. The nonparametric Mann-Whitney Rank-Sum test was performed on the first three questions on the survey to compare differences in mean ranks between the two groups.

On the question, "How do you feel you did on the exam?" the control groups felt that they did not do as well as the treatment group on the exam. On the second question,

Table 5

Chapter Exam I Mean of Individual Questions

#	Question Type	*p* value	Difference	#	Question Type	*p* value	Difference
1	Select From List of Options	0.376	NSSD	10	Multiple Choice	0.988	NSSD
2	Select from List of Options	0.882	NSSD	11	True/False	0.452	NSSD
3	Multiple Choice	0.383	NSSD	12	True/False	0.196	NSSD
4	Multiple Choice	0.084	**SMSD**	13	Fill in the Blank	0.383	NSSD
5	Multiple Choice	0.438	NSSD	14	Fill in the Blank	0.36	NSSD
6	Multiple Choice	0.435	NSSD	15	Matching	0.19	NSSD
7	Short Essay	0.8884	NSSD	16	Integrated Problem	0.063	**SMSD**
8	Multiple Choice	0.693	NSSD				
9	Multiple Choice	0.123	NSSD				

NSSD= No Statistical Significant Difference
SMSD=Statistically Marginal Significant Difference
SSD=Statistically Significant Difference

"What do you think you will get on this exam?" the control group felt that they would get lower scores than the treatment group. On the third question, "Approximately how many hours did you spend studying for this exam?" the control group reported spending more hours studying for the exam than the students in the treatment group. The second and third question have a *p*-value of higher than .05 which indicates no statistically significant difference, however, question one, with a *p*-value of .027 indicates statistically significant

difference in how successful the two groups felt they were on the exam. The data was summarized and analyzed using Microsoft Excel© and SPSS© software and is presented in Table 6 below.

Table 6

Mean Rank-Sum of Participant Feedback – Exam I

Question	Control	Treatment	*p*
How do you feel you did on the exam?	17.50	25.47	.027
What do you think you will get on this exam?	19.22	23.28	.277
Approximately how many hours did you spend studying for this exam?	21.80	19.97	.618

After the first three questions on the participant's exam feedback form, the questions differ based on student participation in the control or treatment group (see Appendix B and Appendix C for comparison of different questions). Data was summarized using Microsoft Excel©. All comments have been reproduced exactly as written by the learner and are provided in Appendix D.

Twelve of the 23 students in the control section received no help in preparation for the exam. Two students used the tutoring center, worked with the instructor online, or utilized a study group or the discussion board. None of the students in the control group

worked with the instructor face-to-face. Seven students made use of various other methods of preparing, for example, the homework management program bundled with the textbook.

Students in the control group felt that some assistance would have helped them be more successful on the exam. Five students would have like to use notes, six their books, seven students a computer. Only two students wanted to be able to work with other learners. Four of the participants would have like to been able to work with the instructor and ten students selected the none and other category. The main theme of the written comments were that students felt they should have studied more or reviewed all of the study aids available.

The majority of the participants in the control group said that were able to use notes, books, and computers on exams taken for other courses, with 18, 12, and 11 reporting respectively. Only four students said they had been able to work with other learners in the past. Four students selected the category of none/other but made no explanatory comments.

Again, the majority of the participants felt that the previous two questions of what would have helped you be more successful on the exam and what items could they use on the exam, helped them to learn the material (seven responses), reduced stress (eight responses) and made the exam a better experience (six responses). However, only one participant felt any of these aids made them feel more active in the classroom and only

two thought it helped them discuss and listen. Four participants provided comments in the none/other section with two comments relating to struggles with the online environment and needing classroom time.

Participants responded that they felt the benefits of an individual exam were really studying the material (10), learning the material better (10), and that they were not distracted by other learners (12). Three participants responded that the instructor would know they know the material and one responded that there were no benefits. Two participants selected the last category of none/other but did not identify the meaning with comments. With the exception of four responses, all participants selected some form of individual exam as their preferred method of testing. Table 7 provides descriptive statistics on student responses for the control group.

Table 7

Control Group Summary of Participant Exam Feedback − Exam I (n=23)

What assistance did you receive in preparing for this exam? Check all that apply.	None	Tutoring Center	Instructor Face-to-Face	Instructor Online	Study Group/Discussion Board	Other - please describe
	12	2		2	2	7
What, do you think, would have helped you be more successful on this exam?	Notes	Books	Computer	Being able to work with other learners	Working with the instructor	None/Other - please describe
	5	6	7	2	4	10

Table 7 Continued

Control Group Summary of Participant Exam Feedback − Exam I (n=23)

Have you been able to take exams before with any of these items? Check all that apply.	Notes	Books	Computer	Being able to work with other learners	Working with the instructor	None/Other - please describe in the additional comments section below
	18	12	11	4	1	4
Why do you think the items in the last two questions made you feel better about the exam? Check all that apply.	I was able to learn the material better	I was as anxious or stressed about the exam	It made the exam a better experience	I felt like I was active in the classroom	I was able to discuss and listen so that I understood how to apply the material better	None/Other - please describe
	7	8	6	1	2	4
What are the benefits of taking an exam individually? Check all that apply.	I really study for the exam	I believe I really learn the material	I am not distracted by others ideas or conversations	The instructor knows I know the material by evidence of my grade	There are no benefits	Other - please describe in additional comments below
	10	10	11	3	1	2
Select your most preferred method for taking an exam.	Individual - no books, no notes	Individual - with books and notes	In a group - no books, no notes	In a group - with books and notes	Individually Online	Group Online
	2	14	1	2	12	1

The participants in the treatment group were split in their responses when receiving assistance in preparing for the exam. There were nine responses for no

assistance and the remaining categories were spread-out evenly. Four responded in the other category with comment themes centering on receiving assistance from various family members and self-study. Students in the treatment group tended to prefer the collaborative nature of the exam, with 15 students selecting that the collaboration helped them a lot or completely to be successful on the exam. Only one student said that the collaborative aspect did not help at all.

Students noted that their preference for testing individually versus collaboratively was favorable for collaborative, with 13 students selecting the last two categories, being a good way or completely preferring this method. Four students were indifferent, selecting that it was fine or they did not have a preference, either way was fine and one student selected they did not prefer the method. Students expressed that the biggest concern about testing collaboratively was that others would not come prepared; twelve of the eighteen students selected this as a concern. The remaining categories for this question where evenly scored with a high of only four students selecting that they would have to do all of the work themselves and only one student concerned that it felt like cheating.

On the question, "What do you like about collaborative exams?" one student selected other and commented that they did not like it. Seven students selected that they felt they learned and understood the material better, three students said they prepared more so they would not let the group down, 11 students said they enjoyed working with others to problem-solve. Finally, nine students said they felt actively engaged in the class and six students selected that they felt like they were developing a network of peers that they could work with in the future.

On the two questions dealing with group preferences and group size, the treatment group responded that three people were the optimal group size and four felt a group of four was better. Their preference for group selection was that the instructor select the groups randomly, eight responses, and that the groups remain the same all semester with eight responses. The other categories in each question had only two to three responses. The one theme that is present in the comments is that students seem to understand what to expect on a collaborative exam after experiencing one. Table 8 summarizes the data on the Participant Exam Feedback for Exam I, additional comments are included in Appendix E.

Table 8

Treatment Group Summary of Participant Exam Feedback −Exam I (n=18)

What assistance did you receive in preparing for this exam? Check all that apply.	None	Tutoring Center	Instructor Face-to-Face	Instructor Online	Study Group/Discussion Board	Other - please describe
	9	1	1	1	2	4
Consider the collaborative aspect of this exam. How do you feel this impacted your success on the exam?	Not At All - I would have been fine on my own	A Little - There were minor things that I needed to talk through and it may have added to my understanding	It helped - I didn't really mind the discussion but I would have also been fine on my own	A lot - This type of exam helped me to better understand the material	Completely - I feel I really understand the material and have learned how to apply it	
	1		2	11	4	

Table 8 Continued

Treatment Group Summary of Participant Exam Feedback −Exam I (n=18)

Consider the differences in taking an exam individually versus collaboratively. What is your preference for taking a collaborative exam?	Do Not Prefer - I like to take my exam individuall y	Its Fine - if that is what is required for the class	Either Way Is Fine - I really have no preference	It is Good - I tend to prefer this method	Completely Prefer - I wish I could take all of my exams this way	
	1	1	3	8	5	
What are your concerns about taking a collaborative exam? Check all that apply.	Others won't come prepared.	I will have to do all of the work.	I won't come prepared.	It feels like I am cheating.	I will be assigned a group grade.	Other - please describe in additional comments below
	12	4	3	1	3	2
What do you like about collaborative exams?	I learn and understand the material better	I don't want to let the group down so I prepare more	I enjoy working with others to solve problems	I feel like I am actively engaged in the class	I feel like I develop a network of peers to work with in the future	Other - please describe in additional comments below
	7	3	11	9	6	1
What are your group preferences for a collaborative exam? Check all that apply.	Learners select their groups	Instructor selects groups randomly.	Instructor selects groups based on ability	Groups are randomly selected	Groups change each exam	Groups remain the same all semester
	2	8	2	3	1	8
What are your preferences regarding groups size for a collaborative exam?	2 people	3 people	4 people	5 people		
		13	4			1

Additionally, the testing groups in the treatment section completed a Professional Skills survey to evaluate the practice of accounting profession criterial skills (Nelson, 1996) on each chapter exam. The survey asked learners to evaluate the practice of these skills using seven skill groups, General Knowledge, Intellectual, Interpersonal Skills, Communication, Organizational and Business Knowledge, Accounting Knowledge, and Personal Capacities and Attitudes. These categories are based on the American Accounting Association's (1986) suggested set of skills that students should have been given the opportunity to practice while in an accounting program. Within each group, the students were asked to respond to specific skills within the broader categories, this detailed data is summarized and presented in Appendix E. Analysis of the professional skills categories follows.

General Knowledge. In the general knowledge category of professional skills, groups split the responses with 21 responding that they practice general knowledge skills some, a lot, or the entire exam and 19 total responses in the very little to not at all categories. In analyzing specific skills within the general knowledge set, groups did not feel that understanding general history and cultural perspective was practiced with five of the eight groups responding they did not, likewise, five groups felt that appreciation for art, literature, and/or science was not practiced on the exam. Interestingly, in the understanding/evaluation of personal values, morals, ethics, and/or beliefs five groups said they practiced this either a lot or the entire exam, whereas, three groups said they did not practice the skill on the exam at all.

Intellectual. There were five specific skills within this category. Overall, groups felt that these skills were practiced some of the time, a lot, or on the entire exam, these responses were selected 37 out of 40. Groups felt that at some level the ability to reason, inquire, and/or critically analyze skills were practiced on a collaborative exam. They also perceived that they practiced identifying problems, problem solving and helped in problem solving on the exam. The lowest rated of the skills within the intellectual category was the ability to identify ethical issues and identify possible consequences of choices, two groups of the eight said that these skills were practiced very little or not at all on this exam.

Interpersonal Skills. In this category, groups felt they practiced the five specific skills some, a lot, or the entire exam. Groups selected practiced a lot or the entire exam thirty-two times versus five times for very little or not at all. The specific skills within the interpersonal skills area include the ability to work in a group to lead and motivate; the ability to work in a group to discuss, argue, negotiate, and problem-solve; and the ability to work in a group to withstand and resolve conflict as three of the five skills.

Communication. Groups felt that the ability to present, discuss, and defend views and the ability to listen effectively, the two specific skills in this category, where practiced some, a lot, or the entire exam. Of the 15 responses only one group said that the ability to present, discuss, and defend views was not practiced at all on the exam.

Organizational and Business Knowledge. In this category, again groups felt that they practiced the four specific skills within the category, some, a lot, or the entire exam. Of the 32 responses only three responses were selected for did not practice. One group

did not feel the skill of understanding of basic finance, including analysis and markets was practiced and two groups did not feel that the skills of understanding of change and growth within an environment were practiced.

Accounting Knowledge. Of the five specific skills in this group, four groups did not think they had used knowledge of policy, environmental and regulation issues and five groups did not think that the knowledge of taxation and its impact on the entity were practiced. In this category, 11 groups felt that these five skills were only practiced some of the time with a total of seven selecting a lot and seven groups selecting the entire exam. Use of the knowledge of the history of accounting profession and general accounting profession thought was seen as being practiced only some of the time or very little.

Personal Capacities and Attitudes. Groups ranked the specific skills of creative thinking, integrity, energy, motivation, persistence empathy, leadership, sensitivity to social responsibilities, and commitment to life-long learning in this category. Sixty-four responses were made that these skills were practiced, some, a lot, or the entire exam. The skill of persistence and motivation ranked the highest with seven of the eight groups selecting either practiced a lot or the entire exam. Integrity, energy, and leadership were selected seven out of eight times as being practiced a lot or the entire exam. Two groups selected commitment to life-long learning as not being practiced at all, with the remaining six groups saying it was practiced a lot or the entire exam. Two groups also said that

creative thinking was not practiced on the entire exam, one group said it was practiced very little, one group selected some, three groups selected that is were practiced a lot, and the final group selected the entire exam.

Group members made no additional comments on this survey. The data was summarized using Microsoft Excel©. The descriptive statistics are presented in Table 9.

Finally, the instructor completed the Professional Skills Feedback survey based on observation of the exam. This will be summarized later in the chapter, as many observations were similar for all three of the chapter exams.

Table 9

Summary of Group Feedback on Professional Skills – Exam I

Professional Skill	Exam I (n=8)				
	Practiced Entire Exam	Practiced Alot	Practiced Some	Practiced Very Little	Did Not Practice
General Knowledge	7	3	11	2	17
Intellectual	11	16	10	1	2
Interpersonal Skills	18	14	3	2	3
Communication	7	7	1	0	1
Organization and Business Knowledge	7	8	14	0	3
Accounting Knowledge	7	7	11	5	10
Personal Capacities and Attitudes	31	26	7	1	7

Exam II: Thirty-six students took the second exam, with 34 of those students consenting to allow their results to be used in the study. Using alpha of .05 the

independent samples *t*-test indicated that neither group performed better or worse than the other group on Exam II, $t(34) = 1.22$, $p = .23$, with the treatment group scoring, on average, 5.26 percentage points lower than the control group, see Table 10 below.

Table 10

Mean Comparison of Chapter Exam II

Exam	n	*t*	*p*	Difference
Exam II	34	1.216	.23	No Statistically Significant Difference

The second exam covered the next three chapters of the material for the course and was worth 150 points. The test consisted of 29 questions, with a mix of conceptual and theory type questions in the form of multiple-choice, true or false, selection, matching, and short essay. The exam also included eight chapter-related short problems.

In an analysis of the individual questions on Exam II, four questions revealed statistically significant differences, one question had a statistically marginal difference and 24 questions had no statistically significant difference, Table 11.

Again, both groups were asked to complete the Participant Exam Feedback survey attached to their exams (Appendices B and C) asking about testing preferences. This form was completed immediately after taking the exam. The nonparametric Mann-Whitney Rank-Sum test was performed on the first three questions listed on the survey to compare differences in mean ranks between the two groups.

On the question, "How do you feel you did on the exam?" the treatment group felt that they did not do as well as the control group on the exam. On the second question, "What do you think you will get on this exam?" the control group felt that they would get

Table 11

Chapter Exam II Mean of Individual Questions

#	Question Type	*p* value	Difference	#	Question Type	*p* value	Difference
1	Problem	0.313	NSSD	16	Multiple Choice	0.559	NSSD
2	Problem	0.02	**SSD**	17	Multiple Choice	0.741	NSSD
3	Problem	0.279	NSSD	18	Multiple Choice	0.739	NSSD
4	True or False	1	NSSD	19	Multiple Choice	0.488	NSSD
5	True or False	0.112	NSSD	20	Multiple Choice	0.285	NSSD
6	Multiple Choice	0.301	NSSD	21	Matching	0.233	NSSD
7	Multiple Choice	1	NSSD	22	Problem	0.43	NSSD
8	Multiple Choice	0.215	NSSD	23	Fill in the Blank	0.098	**SMSD**
9	Multiple Choice	0.001	**SSD**	24	Fill in the Blank	0.031	**SSD**
10	Multiple Choice	1	NSSD	25	Problem	0.548	NSSD
11	Problem	0.895	NSSD	26	Multiple Choice	0.034	**SSD**
12	Problem	0.325	NSSD	27	Multiple Choice	0.325	NSSD
13	Problem	0.674	NSSD	28	Multiple Choice	1	NSSD
14	True or False	0.304	NSSD	29	Multiple Choice	0.215	NSSD
15	True or False	0.112	NSSD				

NSSD= No Statistical Significant Difference
SMSD=Statistically Marginal Significant Difference
SSD=Statistically Significant Difference

lower scores than the treatment group. On the third question, "Approximately how many hours did you spend studying for this exam?" the control group reported spending more hours studying for the exam than the students in the treatment group. All three questions have a *p*-value of higher than .05, which indicates no statistically significant difference. The data was summarized and analyzed using Microsoft Excel© and SPSS© software and is presented in Table 12 below.

Table 12

Mean Rank-Sum of Participant Feedback – Exam II

Question	Control	Treatment	*p*
How do you feel you did on the exam?	16.63	15.41	.66
What do you think you will get on this exam?	14.93	17.00	.52
Approximately how many hours did you spend studying for this exam?	17.87	14.25	.25

After the first three questions on the Participant Exam Feedback form, the questions differ based on student participation in the control or treatment group (see Appendix B and Appendix C for comparison of different questions). Data was summarized using Microsoft Excel©. All comments have been reproduced exactly as written by the learner and are provided in Appendix D.

Six of the 15 students in the control section said they received no help in preparation for the exam. Four students reported they used the tutoring center, worked with the instructor online, or utilized a study group or the discussion board. None of the

student in the control group worked with the instructor face-to-face. Five students made use of various other methods of preparing, for example, the homework management program bundled with the textbook.

Students in the control group felt that some assistance would have helped them be more successful on the exam. Six students would have liked to use notes, five their books, three students a computer. Again, only two students wanted to be able to work with other learners. Two students taking this exam would have liked to have the opportunity to work with the instructor and six students selected the none and other category. The three comments written by the participants were unrelated, one student requested more practice problems in the homework management system, one student commented on illness being a factor for poor performance, and the final student commented that category choices, on the exam, were not sufficient.

The majority of the participants in the control group said that were able to use notes, books, and computers on exams taken for other courses, with 12, 10, and 7 reporting respectively. Only three students said they had been able to work with other learners in the past. Two students selected the none/other category but did not make explanatory comments.

Again, the majority of the participants felt that the previous two questions of what would have helped you be more successful on the exam and what items could they use on the exam, helped them to learn the material (one response), reduced stress (seven responses) and made the exam a better experience (three responses). However, only one

participant felt any of these aids made them feel more active in the classroom and none of the participants thought it helped them to discuss and listen. Three participants selected the none/other section but failed to leave explanatory comments.

Participants responded that they felt the benefits of an individual exam were really studying the material (seven), learning the material better (eight), and that they were not distracted by other learners (seven). Four participants responded that the instructor would know they know the material and one responded that there were no benefits. No participants selected the last category of none/other. Eleven students taking this exam selected their preferred method of testing as an individual exam with books and notes. Two students preferred group testing, with four students preferring an online individual exam. Additional comments made by students related to the need for more practice, test formatting, and reduced stress with the use of testing aids. Table 13 provides descriptive statistics on student responses for the control group.

Table 13

Control Group Summary of Participant Exam Feedback Exam II (n=15)

What assistance did you receive in preparing for this exam? Check all that apply.	None	Tutoring Center	Instructor Face-to-Face	Instructor Online	Study Group/Discussion Board	Other - please describe
	6			3	1	5
What, do you think, would have helped you be more successful on this exam?	Notes	Books	Computer	Being able to work with other learners	Working with the instructor	None/Other - please describe
	6	5	3	2	2	6

Table 13 Continued

Control Group Summary of Participant Exam Feedback Exam II (n=15)

Have you been able to take exams before with any of these items? Check all that apply.	Notes	Books	Computer	Being able to work with other learners	Working with the instructor	None/Other - please describe in the additional comments section below
	12	10	7	3		2
Why do you think the items in the last two questions made you feel better about the exam? Check all that apply.	I was able to learn the material better	I was as anxious or stressed about the exam	It made the exam a better experience	I felt like I was active in the classroom	I was able to discuss and listen so that I understood how to apply the material better	None/Other - please describe
	1	7	3	1		3
What are the benefits of taking an exam individually? Check all that apply.	I really study for the exam	I believe I really learn the material	I am not distracted by others ideas or conversations	The instructor knows I know the material by evidence of my grade	There are no benefits	Other - please describe in additional comments below
	7	8	7	4		
Select your most preferred method for taking an exam.	Individual - no books, no notes	Individual - with books and notes	In a group - no books, no notes	In a group - with books and notes	Individually Online	Group Online
		11	1	1	4	

The participants in the treatment group completed additional questions on the participant feedback form. On the question, "What type of assistance did you receive in preparing for this exam?" there were ten responses for no assistance and one student was assisted by the instructor online, and five students received help from various other sources. Students in the treatment group were split on their preference for the

collaborative nature of the exam, with nine students selecting that the collaboration on the exam helped them a lot or completely in their success on the exam. Only one student said that the collaborative aspect did not help at all. Five students felt that they were fine with either an individual exam or collaborative exam.

Students noted that their preference for testing individually versus collaboratively was favorable for collaborative, with eight students selecting the last two categories, being a good way or completely preferring this method. Three students were indifferent, selecting that it was fine or they did not have a preference, either way was fine and two students selected they did not prefer the method. Once again, students expressed that the biggest concern about testing collaboratively was that others would not come prepared; ten of the fifteen students selected this as a concern. The remaining categories for this question were scored with two students concerned that they would have to do all of the work themselves and that they would not come prepared, one student was concerned that it felt like cheating. Four students selected the other category with two comments provided, one student did not like collaborative exams, and one student was concerned they would not be able to pull their own weight.

On the question, "What do you like about collaborative exams?" as in Exam I, one student selected other and commented that they did not like it. One student selected that they felt they learned and understood the material better, two students said they prepared more so they would not let the group down, seven students said they enjoyed working with others to problem-solve. Finally, two students said they felt actively

engaged in the class and two students selected that they felt like they were developing a network of peers that they could work with in the future.

On the two questions dealing with group preferences and group size, the treatment group responded that three people were the optimal group size and two participants felt a group of four was better. Their preference for group selection was spread out amount the categories on this exam. Three students would prefer that the instructor select the groups randomly, only two students wanted the groups remain the same all semester. On this exam, five students preferred that the instructor select the groups based on ability. The one theme that is present in the comments is that students felt collaborative exams took longer since the group was trying to come to a consensus. Table 14 summarizes the data on the Participant Exam Feedback for Exam II, additional comments are included in Appendix E.

The testing groups in the treatment section again completed a Professional Skills survey to evaluate the practice of accounting profession criterial skills (Nelson, 1996) on each chapter exam. The survey asked learners to evaluate the practice of these skills using seven skill groups, General Knowledge, Intellectual, Interpersonal Skills, Communication, Organizational and Business Knowledge, Accounting Knowledge, and Personal Capacities and Attitudes. These categories are based on the American Accounting Association's (1986) suggested set of skills that students should have been given the opportunity to practice while in an accounting program. Within each group, the students were asked to respond to more specific skills, this detailed data is summarized and presented in Appendix E. Analysis of the professional skills categories follows.

Table 14

Treatment Group Summary of Participant Exam Feedback Exam II (n=16)

What assistance did you receive in preparing for this exam? Check all that apply.	None	Tutoring Center	Instructor Face-to-Face	Instructor Online	Study Group/Discussion Board	Other - please describe
	10			1		5
Consider the collaborative aspect of this exam. How do you feel this impacted your success on the exam?	Not At All - I would have been fine on my own	A Little - There were minor things that I needed to talk through and it may have added to my understanding	It helped - I didn't really mind the discussion but I would have also been fine on my own	A lot - This type of exam helped me to better understand the material	Completely - I feel I really understand the material and have learned how to apply it	
	1	1	5	6	3	
Consider the differences in taking an exam individually versus collaboratively. What is your preference for taking a collaborative exam?	Do Not Prefer - I like to take my exam individually	Its Fine - if that is what is required for the class	Either Way Is Fine - I really have no preference	It is Good - I tend to prefer this method	Completely Prefer - I wish I could take all of my exams this way	
	2	1	3	3	5	
What are your concerns about taking a collaborative exam? Check all that apply.	Others won't come prepared.	I will have to do all of the work.	I won't come prepared.	It feels like I am cheating.	I will be assigned a group grade.	Other - please describe in additional comments below
	10	2	2	1	1	4

Table 14 Continued

Treatment Group Summary of Participant Exam Feedback Exam II (n=16)

What do you like about collaborative exams?	I learn and understand the material better	I don't want to let the group down so I prepare more	I enjoy working with others to solve problems	I feel like I am actively engaged in the class	I feel like I develop a network of peers to work with in the future	Other - please describe in additional comments below
	10	2	2	1	1	4
What are your group preferences for a collaborative exam? Check all that apply.	Learners select their groups	Instructor selects groups randomly.	Instructor selects groups based on ability	Groups are randomly selected	Groups change each exam	Groups remain the same all semester
	10	2	2	1	1	4
What are your preferences regarding groups size for a collaborative exam?	2 people	3 people	4 people	5 people		
		12	2			1

General Knowledge. In the general knowledge category of professional skills, groups split the responses with 13 responses that they practice general knowledge skills some, a lot, or the entire exam and 12 total responses in the very little to not at all categories. In analyzing specific skills within the general knowledge set, groups did not feel that understanding general history and cultural perspective was practiced, with two of the five groups responding they did not and one group said it was practiced very little. Three groups felt that appreciation for art, literature, and/or science was not practiced on the exam and one group responded that is was practiced very little. In the

understanding/evaluation of personal values, morals, ethics, and/or beliefs, three groups said they practiced this either a lot or some, whereas, two groups said they did not practice the skill on the exam at all.

Intellectual. There were five specific skills within this category. Overall, groups felt that these skills were practiced some of the time, a lot, or on the entire exam, these responses were selected 20 times out of 25 responses. Groups felt that at some level the ability to reason, inquire, and/or critically analyze skills were practiced on the collaborative exam, with all five groups selecting practiced some, a lot, or the entire exam. They also reported that they practiced identifying problems, problem solving and helped in problem solving on the exam, with four of the groups selecting practiced a lot or entire exam and one group selecting very little. The remaining categories followed the same trend as the first two specific skills.

Interpersonal Skills. In this category, groups felt they practiced the five specific skills some, a lot, or the entire exam. Groups selected practiced the entire exam 18 times, five times for some practice versus two times for not at all. The specific skills within the interpersonal skills area include the ability to work in a group to lead and motivate; the ability to work in a group to discuss, argue, negotiate, and problem-solve; and the ability to work in a group to withstand and resolve conflict as three of the five skills. Four of the five groups selected all five skills as being practiced the entire exam.

Communication. Groups felt that the ability to present, discuss, and defend views and the ability to listen effectively, the two specific skills in this category, where

practiced some, a lot, or the entire exam. Three of the groups selected both skills as practiced on the entire exam.

Organizational and Business Knowledge. In this category, again groups felt that they practiced the four specific skills within the category, some, a lot, or the entire exam. Of the 16 responses, only four responses were selected for practiced very little or did not practice. Two groups did not feel that understanding of change and growth within an environment skills were practiced during the exam.

Accounting Knowledge. Of the five specific skills in this group, the category of practiced some of the time was selected 11 of the 25 times. There were nine responses for practicing these skills a lot or the entire exam and five for practicing very little or not at all. The specific skills were spread out as to the responses with no notable responses.

Personal Capacities and Attitudes. Groups ranked the specific skills of creative thinking, integrity, energy, motivation, persistence, empathy, leadership, sensitivity to social responsibilities, and commitment to life-long learning in this category. Forty-one responses were made that these skills were practiced, some, a lot, or the entire exam. The skill of persistence and motivation ranked the highest with four of the five groups selecting practiced the entire exam. Creative thinking, integrity, and leadership skills were selected four out of five times as being practiced a lot or the entire exam. One group felt that the skills of integrity, empathy, sensitivity to social responsibility and commitment to life-long learning were not practiced at all during the exam.

Group members made no additional comments on this survey. The data was summarized using Microsoft Excel©. The descriptive statistics are presented in Table 15.

The instructor again completed the Professional Skills Feedback survey based on observation of the exam. This will be summarized later in the chapter, as many observations were similar for all three of the chapter exams.

Table 15

Summary of Group Feedback on Professional Skills – Exam II

Professional Skill	Exam II (n=5)				
	Practiced Entire Exam	Practiced Alot	Practiced Some	Practiced Very Little	Did Not Practice
General Knowledge	1	3	9	2	10
Intellectual	15	3	2	4	1
Interpersonal Skills	18	0	5	0	2
Communication	6	2	2	0	0
Organization and Business Knowledge	5	3	4	2	2
Accounting Knowledge	5	4	11	4	1
Personal Capacities and Attitudes	22	5	14	0	4

Exam III: The third exam covered the final three chapters of the material for the course and was worth 150 points. The test consisted of 30 questions with a mix of conceptual and theory type questions in the form of multiple-choice, true or false, selection, matching, and short essay. Fifteen of the 30 questions on the exam were chapter-related short problems.

Thirty-two students took the third exam, with all of those students consenting to allow their results to be used in the study. Using an alpha of .05, the independent samples *t*-test indicated there was no statistically significant difference between the mean scores of the two groups, $t(32) = .19$, $p = .85$, Table 16.

Table 16

Mean Comparison of Chapter Exam III

Exam	N	T	P	Difference
Exam III	32	.19	.85	No Statistically Significant Difference

In the analysis of the individual questions on Exam III, three questions revealed statistically significant differences, two questions had statistically marginal differences and twenty-five questions did not indicate a statistically significant difference, Table 17 provides the data on the mean comparison for Exam III.

As with the first two exams, both groups were asked to complete the Participant Exam Feedback survey attached to their exams (Appendices B and C) asking about testing preferences. This form was completed immediately after taking the exam. The nonparametric Mann-Whitney Rank-Sum test was performed on the first three questions on the survey to compare differences in mean ranks between the two groups.

On the question, "How do you feel you did on the exam?" the treatment group felt that they did not do as well as the control group on the exam. On the second question, "What do you think you will get on this exam?" the control group felt that they would get lower scores than the treatment group.

Table 17

Chapter Exam III Mean of Individual Questions

#	Question Type	*p* value	Difference	#	Question Type	*p* value	Difference
1	Problem	0.369	NSSD	16	Multiple Choice	0.456	NSSD
2	Problem	0.949	NSSD	17	Multiple Choice	0.022	**SSD**
3	Problem	0.44	NSSD	18	Multiple Choice	0.042	**SSD**
4	Problem	0.652	NSSD	19	Matching	0.296	NSSD
5	Problem	0.55	NSSD	20	Short Essay	0.283	NSSD
6	True or False	0.181	NSSD	21	Yes or No	0.653	NSSD
7	Multiple Choice	0.012	**SSD**	22	Problem	0.398	NSSD
8	Multiple Choice	0.353	NSSD	23	Problem	0.894	NSSD
9	Multiple Choice	0.32	NSSD	24	Problem	0.133	NSSD
10	Multiple Choice	0.406	NSSD	25	Problem	0.223	NSSD
11	Problem	0.061	**SMSD**	26	Problem	0.564	NSSD
12	Problem	0.406	NSSD	27	True or False	1	NSSD
13	Problem	0.061	**SMSD**	28	Multiple Choice	0.733	NSSD
14	Problem	0.596	NSSD	29	Multiple Choice	0.115	NSSD
15	Problem	0.297	NSSD	30	Matching	0.992	NSSD

NSSD= No Statistical Significant Difference
SMSD=Statistically Marginal Significant Difference
SSD=Statistically Significant Difference

On the third question, "Approximately how many hours did you spend studying for this exam?" the control group reported spending more hours studying for the exam than the students in the treatment group. All three questions have a *p*-value of higher than .05, which indicates no statistically significant difference, however question one had a *p*-value of .06 and is therefore had a statistically marginal significant difference. The data was summarized and analyzed using Microsoft Excel© and SPSS© software and is presented in Table 18 below.

Table 18

Mean Rank-Sum of Participant Feedback – Exam III

Question	Control	Treatment	*p*
How do you feel you did on the exam?	12.87	17.29	.06
What do you think you will get on this exam?	13.17	16.96	.22
Approximately how many hours did you spend studying for this exam?	15.87	14.07	.56

After the first three questions on the Participant Exam Feedback form, the questions were different based on student participation in the control or treatment group (see Appendix B and Appendix C for comparison of different questions). Data was summarized using Microsoft Excel©. All comments have been reproduced exactly as written by the learner and are provided in Appendix D.

Six of the 15 students in the control section reported receiving no help in preparation for the exam. Six students indicated that they worked with the instructor online, utilized a study group, or the discussion board. None of the students in the control

group reportedly worked with the instructor face-to-face or used the tutoring center. Three students made use of various other methods of preparing, for example, the homework management program bundled with the textbook or other outside assistance.

Students in the control group felt that some assistance would have helped them be more successful on the exam. Eleven students would have liked to use notes; six indicated they would have liked to use their books, five students a computer. Only two students wanted to be able to work with other learners and two with the instructor. Four students selected the none and other category with the main theme of the written comments being that students felt they should have studied more or reviewed all of the study aids available.

The majority of the participants in the control group said that were able to use notes, books, and computers on exams taken for other courses, with 14, 11, and 8 reporting respectively. Four students said they had been able to work with other learners in the past. One student selected the none/other category but made no explanatory comments.

Again, the majority of the participants felt that the previous two questions of what would have helped you be more successful on the exam and what items could they use on the exam, helped them to learn the material (five responses), reduced stress (10 responses) and made the exam a better experience (three responses). No participants selected that it made them feel more active in the classroom and only one thought it helped them to discuss and listen. Two participants selected the none/other section with only one comment relating to difficulty in memorizing.

Participants responded that they felt the benefits of an individual exam were really studying the material (eight), learning the material better (nine), and that they were not distracted by other learners (six). All participants selected some form of individual exam as their preferred method of testing, three of those selected their preference was an online individual exam. Table 19 provides descriptive statistics on student responses for the control group.

Table 19

Control Group Summary of Participant Exam Feedback Exam III (n=15)

What assistance did you receive in preparing for this exam? Check all that apply.	None	Tutoring Center	Instructor Face-to-Face	Instructor Online	Study Group/Discussion Board	Other - please describe
	6			3	3	3
What, do you think, would have helped you be more successful on this exam?	Notes	Books	Computer	Being able to work with other learners	Working with the instructor	None/Other - please describe
	11	6	5	2	2	4
Have you been able to take exams before with any of these items? Check all that apply.	Notes	Books	Computer	Being able to work with other learners	Working with the instructor	None/Other - please describe in the additional comments section below
	14	11	8	4		1
Why do you think the items in the last two questions made you feel better about the exam? Check all that apply.	I was able to learn the material better	I was as anxious or stressed about the exam	It made the exam a better experience	I felt like I was active in the classroom	I was able to discuss and listen so that I understood how to apply the material better	None/Other - please describe
	5	10	3		1	2

Table 19 Continued

Control Group Summary of Participant Exam Feedback Exam III (n=15)

What are the benefits of taking an exam individually? Check all that apply.	I really study for the exam	I believe I really learn the material	I am not distracted by others ideas or conversations	The instructor knows I know the material by evidence of my grade	There are no benefits	Other - please describe in additional comments below
	8	9	6	5		
Select your most preferred method for taking an exam.	Individual - no books, no notes	Individual - with books and notes	In a group - no books, no notes	In a group - with books and notes	Individually Online	Group Online
		13			3	

The participants in the treatment group indicated that 11 received no assistance in preparing for the exam and one used the tutoring center. Two responded in the other category with comment themes centering on receiving assistance from provided homework helps in the homework management system. Students in the treatment group tended to prefer the collaborative nature of the exam, with seven students selecting that the collaboration on the exam helped them a lot or completely to be successful. However, six students said they it was fine either way or it only helped a little and one student said that the collaborative aspect did not help at all.

Students noted that their preference for testing individually versus collaboratively was favorable for collaborative, with eight students selecting the last two categories, being a good way or completely preferring this method. Five students were indifferent, selecting that it was fine or they did not have a preference, either way was fine and one

student selected they did not prefer the method. Students expressed that the biggest concern about testing collaboratively was that others would not come prepared; eight of the fourteen students selected this as a concern. In the remaining categories for this question, six students had concerns that they would have to do all of the work and six students had the concern that they would not come prepared. One student was concerned that they would be assigned a group grade and one student made the comment that others would work independently.

On the question, "What do you like about collaborative exams?" three students selected that they felt they learned and understood the material better, four students said they prepared more so they would not let the group down, six students said they enjoyed working with others to problem-solve. Finally, four students said they felt actively engaged in the class and six students selected that they felt like they were developing a network of peers that they could work with in the future.

On the two questions dealing with group preferences and group size, eight participants responded that three people were the optimal group size and six felt a group of four was better. Their preference for group selection was that the instructor selects the group randomly, with nine responses. Three students preferred to select their own groups, two students preferred the instructor select the group based on ability, and four students each selected that groups are selected randomly and remain the same all semester. There was only one additional comment dealing with the student's appreciation for the instructional style. Table 20 summarizes the data on the Participant Exam Feedback for Exam I, additional comments are included in Appendix E.

Table 20

Treatment Group Summary of Participant Exam Feedback −Exam I (n=18)

What assistance did you receive in preparing for this exam? Check all that apply.	None	Tutoring Center	Instructor Face-to-Face	Instructor Online	Study Group/Discussion Board	Other - please describe
	11	1				2
Consider the collaborative aspect of this exam. How do you feel this impacted your success on the exam?	Not At All - I would have been fine on my own	A Little - There were minor things that I needed to talk through and it may have added to my understanding	It helped - I didn't really mind the discussion but I would have also been fine on my own	A lot - This type of exam helped me to better understand the material	Completely - I feel I really understand the material and have learned how to apply it	
	1	3	3	6	1	
Consider the differences in taking an exam individually versus collaboratively. What is your preference for taking a collaborative exam?	Do Not Prefer - I like to take my exam individually	Its Fine - if that is what is required for the class	Either Way Is Fine - I really have no preference	It is Good - I tend to prefer this method	Completely Prefer - I wish I could take all of my exams this way	
	1	1	4	3	5	
What are your concerns about taking a collaborative exam? Check all that apply.	Others won't come prepared.	I will have to do all of the work.	I won't come prepared.	It feels like I am cheating.	I will be assigned a group grade.	Other - please describe in additional comments below
	8	6	6		1	1

Table 20 Continued

Treatment Group Summary of Participant Exam Feedback −Exam I (n=18)

What do you like about collaborative exams?	I learn and understand the material better	I don't want to let the group down so I prepare more	I enjoy working with others to solve problems	I feel like I am actively engaged in the class	I feel like I develop a network of peers to work with in the future	Other - please describe in additional comments below
	3	4	6	4	6	
What are your group preferences for a collaborative exam? Check all that apply.	Learners select their groups	Instructor selects groups randomly.	Instructor selects groups based on ability	Groups are randomly selected	Groups change each exam	Groups remain the same all semester
	3	9	2	4	4	1
What are your preferences regarding groups size for a collaborative exam?	2 people	3 people	4 people	5 people		
		8	6			

As on the first two exams, the testing groups in the treatment section completed a Professional Skills survey to evaluate the practice of accounting profession criterial skills (Nelson, 1996) on each chapter exam. The survey asked learners to evaluate the practice of these skills using seven skill groups, General Knowledge, Intellectual, Interpersonal Skills, Communication, Organizational and Business Knowledge, Accounting Knowledge, and Personal Capacities and Attitudes. These categories are based on the American Accounting Association's suggested set of skills that students should have been given the opportunity to practice while in an accounting program. Within each group, the students were asked to respond to more specific skills, this detailed data is

summarized and presented in Appendix E. Analysis of the professional skills categories follows.

General Knowledge. In the general knowledge category of professional skills, groups responded eleven times that they practice general knowledge skills some, a lot, or the entire exam and seven responses in the very little to not at all categories. In analyzing specific skills within the general knowledge set, groups felt that understanding general history and cultural perspective skills were practiced some on the exam with three of the four groups responding on this skill. All four groups felt that appreciation for art, literature, and/or science was practiced some, very little, or not practiced on the exam. In the understanding/evaluation of personal values, morals, ethics, and/or beliefs three groups said they practiced this some, either a lot or the entire exam, whereas, one groups said they did not practice the skill on the exam at all.

Intellectual. There were five specific skills within this category. Overall, groups felt that these skills were practiced some of the time, a lot, or on the entire exam, these responses were selected 20 times out 20. No group selected any of the five specific skills within this category as being practiced very little or not at all.

Interpersonal Skills. In this category groups felt they practiced the five specific skills some, a lot, or the entire exam. Groups selected practiced a lot or the entire exam eighteen times versus two times for very little or not at all. The specific skills within the interpersonal skills area include the ability to work in a group to lead and motivate; the

ability to work in a group to discuss, argue, negotiate, and problem-solve; and the ability to work in a group to withstand and resolve conflict as three of the five skills. There are no notable trends for any of the specific skills.

Communication. Groups felt that the ability to present, discuss, and defend views and the ability to listen effectively, the two specific skills in this category, where practiced some, a lot, or the entire exam. There were no responses from groups in the categories of practiced very little or not practiced at all on the exam.

Organizational and Business Knowledge. In this category, again groups felt that they practiced the four specific skills within the category, some, a lot, or the entire exam. Of the thirty-two responses only three responses were selected for did not practice. One group did not feel the skill of understanding of basic finance, including analysis and markets was practiced and two groups did not feel that understanding of change and growth within an environment were skills practiced.

Accounting Knowledge. In this category, groups felt that these five skills were only practiced some of the time on the exam, with eleven responses. There were nine responses that the skills with in this category were practiced very little or not at all. The skill of practicing policy, environmental, and regulation issues skills were selected as being practice some or not at all. Overall, learners rated each specific skill as only being practiced some with two groups selecting this level of practice on the first four skills and three groups on the final skill.

Personal Capacities and Attitudes. Groups ranked the specific skills of creative thinking, integrity, energy, motivation, persistence empathy, leadership, sensitivity to

social responsibilities, and commitment to life-long learning in this category. Thirty-two out of 36 responses were made that these skills were practiced, some, a lot, or the entire exam. Only the specific skill of motivation was selected more than the others as being practiced a lot or the entire exam, with four responses.

Group members made no additional comments on this survey. The data was summarized using Microsoft Excel©. The descriptive statistics are presented in Table 21.

Table 21

Summary of Group Feedback on Professional Skills – Exam III

Professional Skill	Exam III (n=4)				
	Practiced Entire Exam	Practiced Alot	Practiced Some	Practiced Very Little	Did Not Practice
General Knowledge	1	4	6	2	6
Intellectual	7	7	6	0	0
Interpersonal Skills	4	13	1	1	1
Communication	2	5	1	0	0
Organization and Business Knowledge	1	10	3	2	0
Accounting Knowledge	2	4	11	7	2
Personal Capacities and Attitudes	5	15	12	2	2

As mentioned previously, the instructor completed the Professional Skills Feedback survey based on observation of the groups while taking their exam. The observations are summarized once due to the similarity in the skills being practiced.

General observations about the collaborative exams developed into three themes. The first observation was that learners were less willing to come to campus to test in a group for this online section. It took several attempts for each group on each exam to get the members to schedule a testing time. On each occasion of a chapter exam, at least one learner failed to show up for their exam without prior notification and had to be scheduled into another exam.

The second general observation was the learners liked the process once they understood it. On the first exam, learners initially asked many questions when getting started in their groups and seemed to feel a little nervous with each other. However, once they got started working each group appeared to become a team and with only one exception, members supported other members in completing the exam.
When learners came to the second and third chapter exams, even though they were working with new members they began working right away. All groups were seen actively engaged in learning and at times sharing a joke or encouraging others when the exam became more difficult.

The third observation was that these online learners did not take the exams as seriously after the first exam. It was noted that learners commented on their lack of preparation for the next two exams. Learners also had to be encouraged to work together on the last two exams and not work ahead. Additionally, learners appeared to try to work too quickly through the exam.

Observations where made of learners practicing the skills listed on the Professional Skills Feedback form. The instructor used this form to make notations about skills practiced. In general, the skills practiced were common to all three exams. A general summary is provided by category.

General Knowledge. Within this category, the two key skills practiced a lot on the exam were those of use of other subjects, specifically basic math skills, and the practice of personal values, morals, ethics, and/or beliefs. As this is a beginning course in accounting students generally, only need a basic ability in mathematics. In following the instructions and spirit of a collaborative exam, students had opportunities to practice values, morals, and ethics. At various times learners were observed to struggle with issues of working ahead, not assisting other members of their group, and questioning whether overhearing other groups answers or comments was cheating.

Intellectual. Learners were observed on each of the exams practicing skills of reasoning, inquiry, and critical analysis. This was practiced due to the nature of the subject matter and the structure of the exam problems. It was especially observed on the first exam, which had one comprehensive problem that was worth half of the points on the exam. This problem required learners to use knowledge from all four chapters on the exam. Learners were also observed to identify problems, problem-solve, and help other learners problem solve. Learners discussed what the questions and problems were actually asking, discussed learning gaps, and made explanations of accounting concepts when necessary.

Interpersonal Skills. All five specific skills were observed to be practiced during the entire time on each of the exams. Learners discussed, argued, negotiated, and problem-solved as a group. Additionally, learners were observed withstanding and resolving conflicts; this was on a minimal basis but observed in each group on each exam. There was more than one member in each group that was observed to practice leading and motivating other members of the group and at times encouraging other groups.

Communication. Learners were observed to practice listening effectively. Although the use of these skills was limited at first, learners appeared to get better as each exam progressed. At times, conflicts arose and overall learners listened to arguments of group members but needed more practice in not cutting other members off. Learners practiced presenting, discussing, and defending views on a limited basis on the exams. There was a tendency for learners to concede if more than one member felt an answer was correct.

Organizational and Business Knowledge. These skills were observed to be practiced very little or not at all on the exam. General business and accounting workplace practices and workplace group dynamics skills seemed to be practiced very little on the exam. The learners lacked general language skills of the business and skills in negotiating effectively.

Accounting Knowledge. Basic accounting concepts, reporting issues and understanding of needs of users of information was a skill in this category that learners practiced the entire exam for each exam. Additionally, learners practiced the ability to

apply accounting knowledge to real world problems. The exams were structured for practicing of these skills. Learners were not provided with many opportunities to practice applying the history of accounting profession and general professional thought and policy, environmental and regulation issues.

Personal Capacities and Attitudes. Learners were observed to practice these skills the most. The collaborative nature of the exam provided numerous opportunities for learners to practice integrity, energy, motivation, and persistence. These skills were observed as the exams moved to concepts that are more difficult or as an example, on the first exam when students had to complete a large comprehensive problem. Learners also practiced creative thinking in relation to learning how to work on an exam in a group. On a limited basis, learners practiced the skills of empathy and leadership. On a few occasions a member was late for their scheduled exam time, the group had started the exam already, when the late member arrived each group made the decision to begin the exam again with the new group member.

The instructor was pleased to see learners practicing, at some level, more than one skill in each category. Instructor observations are summarized in Table 22 below and all comments are compiled in Appendix E.

Table 22

Instructor Observations – Chapter Exam I, II and III

Professional Skill	Practiced Entire Exam	Practiced A lot	Practiced Some	Practiced Very Little	Did Not Practice
General Knowledge		Other subjects – basic math; Personal values, morals, ethics, and/or beliefs	Political, social and economic issues	General history/cultural perspective	Appreciation of art, literature, and/or science
Intellectual		Reason, inquire, and/or critically analyze; Identify problem, problem-solve, help problem-solve	Identify ethical issues and consequences; Identify appropriate alternatives and analyze consequences; Meet stressful deadlines effectively and efficiently		
Interpersonal Skills	All skills within this category				
Communication		Ability to effectively listen	Ability to present, discuss and defend		
Organization and Business Knowledge			General business and accounting workplace practices; Workplace group dynamics	Basics of finance, including analysis and markets; Change and growth within an environment	

Table 22 Continued

Instructor Observations – Chapter Exams I, II and III

Accounting Knowledge	Basic accounting concepts, reporting issues and understanding of needs of users of information	Ability to apply accounting knowledge to real world problems	Taxation and its impact on the entity	History of accounting profession and general professional thought; Policy, environ-mental and regulation issues
Personal Capacities and Attitudes	Integrity; Energy; Motivation; Persistence	Creative Thinking;	Empathy; Leadership	Sensitivity to social re-sponses; Commitment to life-long learning

Final Exam

The posttest or final exam was conducted in the same manner as the pretest, with both the control and the treatment groups completing the exams in the institution's Academic Testing Center. Although students were not made aware, the same 50 multiple-choice questions were given on the final exam as were on the pretest. The testing window, collection of data, and scoring methods were the same as for the pretest.

Thirty-three students were remaining in the two groups at the end of the semester, two students failed to complete the final exam. All thirty-one students consented to participate in the study. Using an alpha of .05, the independent samples *t*-test indicated there was a statistically significant difference between the groups, $t(31) = 2.49$, $p = .02$. Data is presented below in Table 23.

Table 23

Mean Comparison of Final Exam

Exam	N	*t*	*p*	Difference
Final Exam (Posttest)	31	2.49	.02	Statistically Significant Difference

Summary

The data compiled in this study supports the questions asked. The quantitative data of the mean comparison of the final exam answers the primary research question, what is the impact of collaborative testing on summative final exam scores? It also supports the hypothesis that there is a difference on overall final exam scores between students using collaborative testing versus traditional testing.

The quantitative and qualitative data provided in the Participant Feedback surveys and in the Professional Skills Feedback survey, also provides support for the secondary questions. This data supports the secondary research questions, 1) How do students perceive the influence of collaborative testing on formative assessments? 2) How do learners perceive they are practicing accounting criterial skills (Nelson, 1996) during collaborative exams? 3) How does the instructor perceive practicing of accounting criterial skills by learners during collaborative exams?

Through observations of learners and summary of learners' preferences for testing the data supports and answers questions about learners' perceptions during a collaborative exam. Additionally, the data collected on the Professional Skills Feedback survey for the groups and in the instructor observations provides support and answers the

questions of whether learners practice criterial skills (Nelson, 1996) of the profession during collaborative exams. Chapter 5 will provide results, conclusions, and recommendations that follow from the data.

CHAPTER 5. RESULTS, CONCLUSIONS, AND RECOMMENDATIONS

Summary of the Study

Research Questions

Primary Research Question. What is the impact of collaborative testing on summative final exam scores?

Hypothesis. There is a difference on overall final exam scores between students using collaborative testing versus traditional testing.

Secondary Research Questions.

1. How do students perceive the influence of collaborative testing on formative assessments?
2. How do learners perceive they are practicing accounting criterial skills (Nelson, 1996) during collaborative exams?
3. How does the instructor perceive practicing of accounting criterial skills (Nelson, 1996) by learners during collaborative exams?

Purpose and Significance of the Research Study

The purpose of this mixed methods study (Creswell, 2008) was to find the extent to which collaborative testing improves final exam grades. Additionally, data was collected on how collaborative testing provides opportunities to practice the profession of accounting in a broader context and how learners perceived their success on exams and the retention of concepts following the use of collaborative testing. Currently, a gap

exists in the literature in these areas and this study expands the knowledge specifically in accounting education, and more broadly in the field of higher education.

Review of Literature

A review of the literature shows that accounting education is in flux. There has been resistance to change; however, a growing number of those involved in accounting education recognize the need for a significant change in the methods used to teach students (Cohen Commission Report on Tentative Conclusions, 1977; Mautz, 1974; Perspective on Education, 1989). Accounting organizations, practitioners of accounting and accounting educators have come to understand that students will not be successful in an accounting career with only the technical skills of the profession (Albrecht & Sack, 2000; AAA, 1986; Bloom et al., 1994). A common goal of each group has been to answer the call to develop alternative instructional and assessment methods to help students leave accounting programs with a solid command of the technical skills along with opportunities to have practiced professional criterial skills (Nelson, 1996).

Collaborative learning provides an avenue to the search for alternative methods of instruction and assessment in accounting. Supported by the theories of andragogy, constructivism, cognitive constructivism and social constructivism, the use of collaborative learning methods helps educators provide engaging, active, and social meaning-making which, in turn, may increase motivation for the adult student to learn (MacGregor, 1992). When educators apply the basic principles and strategies of collaborative learning they open up the learning environment to providing opportunities

for learners to practice being in the profession, allowing them to succeed or fail, while minimizing the risks that cannot be avoided in the real world (Bruffee, 1999).

The first and primary principle in collaborative learning is meaningful communication (Bruffee, 1999). This meaningful communication, combined with the foundational knowledge of the specialization, creates opportunities for learners to increase critical thinking, problem-solving, argument, and teambuilding skills, to name a few. This meaningful communication allows for the sharing of knowledge and authority in the learning environment while learners work in heterogeneous groups with the instructor in the role of facilitator.

There is a significant change in the role of the instructor with collaborative learning (Tinzmann et al., 1990) this can be both liberating and intimidating. Educators will need guidance and practice when moving from the role of knowledge dispenser to facilitator. However, if the process of collaboration is to work, the educator must be willing to take the necessary steps to move in the right direction. As collaborative learning continues to become a better understood and accepted method in higher education, the educator will be able to find an abundance of resources for implementing collaborative learning techniques.

Not only does the role of the instructor change (Miller, Groccia, & Wilkes, 1996) but the role of the learner also must change (Bruffee, 1999; Crowe & Pemberton, 2002; Tinzmann et al., 1990). Students may prove to be as reluctant as the educators are to make the changes necessary for a successful collaborative environment. Students will likely have some experience with collaborative learning, both positive and negative.

Students are required to be responsible for meeting their learning goals. The instructor guides them as opposed to directing them. This change can be unnerving for students, and they may resist and possibly attempt to sabotage the process.

Both student (Davis, 1993) and educator (Enerson, Johnson, Milner, & Plank, 1997) have concerns about collaborative learning. At the outset, they may seem different; however, several concerns are often the same. Cheating and workload are two of the most common concerns. The overriding concern is that students are learning what they need to know to be successful, not only in the course but in their chosen professions. The use of various techniques within collaborative learning can help to alleviate some concerns. It may be that as each implement and practice the principles of collaborative learning the concerns will be overshadowed by the successes (Davis & Dudley, 1997; Debessay, 2004; Haddock, 2001; Meseke, Nafziger, & Meseke, 2008).

Collaboration tied to assessment may present the biggest concern. Collaborative assessment when seen as formative, that is, discovering how well a student is learning, seems to be the most common and most acceptable (National Research Council, 2000). However, assessment when seen as evaluative referred to in this study as summative, which is, testing an individual learner's knowledge of course content, may be seen as cheating and may not indicate what an individual student knows (Slusser, 2004, August). The educator will need to make an appropriate determination of what they are trying to assess when deciding whether to tie collaborative learning with a summative assessment.

Collaborative testing has been shown to decrease anxiety during testing, and it is reported that student's attitudes about the assessment and the course are generally more positive (Simkin, 2005).

Research Method and Design

This mixed methods study (Creswell, 2008) addressed the influence of collaborative testing on learning using a quasi-experimental approach. The study used a modified embedded mixed methods design in which the qualitative and quantitative data, associated with the secondary questions, provides a supportive role in a study based primarily on the quantitative data set associated with the primary question. This study used a pre and posttest, which was a departmental final exam, given as a traditional comprehensive exam in two sections of Accounting Principles I, to test the theory of influence on learning that predicts collaborative testing will positively influence final exam grades.

Discussion of Results

Pretest

A pretest was given to the control and the treatment groups. The pretest was the same for both groups and was taken individually in the institution's Academic Testing Center. Neither group used any aids to complete the exam. The purpose of the pretest was to determine if there was a statistical difference in the scores of the two groups in order to establish comparability.

Due to the small sample size, the appropriate statistical test was determined to be an independent samples *t*-test. Based on the data presented in Chapter 4, a comparison of

the pretest means indicated that neither group performed better or worse than the other, $t(37) = .52$, $p = .60$, using alpha of .05. Therefore, the groups are assumed to be at the same level and understanding of accounting when starting the course. These results were expected since learners self-registered for the control and the treatment sections with no prior knowledge of which section would be testing individually and which would be testing collaboratively. Additionally, learners were not aware a study was being conducted until the start of the course. In general, course sections tend to be diverse and heterogeneous when learners self-register.

Chapter Exams

Each chapter exam included a mix of short problems, multiple-choice, true or false, fill-in-the-blank, matching, and short answer or essay questions and were intended to be evaluative in nature. Groups took the same exam, the control group took the exam individually in the institution's Academic Testing Department, and the treatment group took the exam collaboratively, in small groups of three or four. The treatment group scheduled their exam with the instructor and took the exam with the instructor present. Neither group was allowed to use any aids on the exam.

Using alpha of .05 the independent samples *t*-test indicated that neither group performed better or worse than the other on Exam I, II, or III. An analysis of the means of individual questions showed that for the three exams combined (75 questions), only five of those questions showed a statistically significant difference, and another five showed a statistically marginal significant difference. Six of those were multiple-choice, four were problems, and one was a fill-in-the-blank. From the data presented in Chapter 4, there

does not seem to be a strong pattern of either group performing better or worse on particular types of questions. The data indicates that the control and the treatment group performed the same on the chapter exams, regardless of the testing method.

This was an interesting piece of data since several studies (Bloom, 2006; Breedlove, Burkett, & Winfield, 2004; Cortright et al., 2003; and Lusk & Conklin, 2002) in this area have indicated that students perform better using a collaborative method. There may have been greater improvement on the part of the treatment group if the learners had taken advantage of more of the collaborative opportunities within the course and if they had stayed in the same group the entire semester. Breedlove, Burkett, and Winfield (2004) also suggested that learners would perform better on collaborative tests when supported, throughout the semester, with collaborative instructional methods. Observation of the treatment group indicated that learners showed an initial and continued resistance to coming to campus to test. Although once they took the first exam collaboratively, all but one student in the group indicated this was their preferred method.

Four students in the treatment group did not feel overly compelled to make their appointment for testing on time or, in some instances, at all, choosing to have the group start over when they arrived or to join another group. The online nature of this course may have contributed to the lack of community development among learners, and therefore the lack of a sense of responsibility to the group in which they were testing. Five students in the course indicated on all three exams that they met or attempted to meet with members of their group to study before the exam. On three occasions, it was observed that those groups worked better by arriving on time, starting on time, being

more relaxed and working with less conflict; however, their performance was, on average, the same as the other groups.

An interesting observation on the fist exam arose with the comprehensive problem. This problem assessed the learner's ability to complete the entire accounting cycle and made up half of the 200 points for the exam. Observation of the treatment group noted expressions of being overwhelmed by the enormity of the problem and a frustration with how to start. In every group, at least one learner took the leadership role and encouraged the group to 'just get started' and continued motivating the group throughout the long process. All of the groups in the treatment section fully completed the comprehensive problem with few or no mistakes. Further, there were comments on completion that it was not as bad as they thought it would be or that they may not have gotten through it by themselves.

In comparison, six learners in the control group did not complete more than half of the comprehensive problem. Learners in the control group commented that they felt overwhelmed, frustrated, and underprepared for the exam. They also indicated that they felt they would have performed better on the exam if they had been allowed to use notes or a book. The *p* value on the comprehensive problem was .063 indicating a statistically marginal significant difference and may indicate that collaborative testing has a positive influence on this type of problem, as well as the attitude and perceptions of ability to complete the problem successfully

After completion of the chapter exam, each group was asked to provide feedback, (see Participant Feedback Survey in Appendices B and C). The first three questions were

the same for both groups and were analyzed using the nonparametric Mann-Whitney Rank-Sum test. On the question, "How do you feel you did on this exam?" the control group, for all three exams, indicated that they felt they performed less successfully than the treatment group. On the question, "What do you think you will get on this exam?" the control group, for all three exams, felt that they would receive lower grades than the treatment group indicated. Finally, on the question, "Approximately how many hours did you spend studying for the exam?" the control group indicated that they spent more hours studying for the exam than the treatment group.

With the exception of the first question, on the first exam, which showed a statistically significant difference, all other participant feedback questions on all chapter exams indicated no statistically significant difference between the two groups. This data may indicate that learners using a collaborative testing format may feel as though they are performing better on the test, when they in fact are performing the same as those learners taking the same exam individually. Likewise, learners testing individually feel less successful about their performance when in fact they have performed as well as those learners in the collaborative group.

Upon observation of the treatment group, this observation is likely due to the ability of some learners to motivate other learners to critically discuss the concepts and come to a consensus within the group. Learners may then be led to feel as though they have achieved a correct answer because the majority of the group has agreed on the answer. Learners who are perceived to be smarter, but could only be more persuasive, by other group members may lead the group to feel unrealistically positive about the

outcome of the exam. Learners in a collaborative exam setting may also believe that they do not have to study as much since there will be others testing with them, and this will create a collective knowledge that is sufficient to be successful or they will be able to talk through it to arrive at a correct answer.

Participant Feedback

Individual Learner Feedback. Learners in both groups indicated that they received little assistance in preparing for the exam. The methods of assistance offered, including the tutoring center, instructor online, and study group/discussion board, was not used more or less by either group. The other selection by both groups indicated that they made use of the resources in the homework management system. See Appendices B and C for an example of the Participant Feedback Survey instrument for both groups.

The control group, on all three exams, indicated that they would have preferred to use books, notes and a computer as aids on the exam. Further, they indicated that they had been able to use the aids on previous exams, saying that they felt they were able to learn the material better, they were not as anxious or stressed about the exam, and it made the exam a better experience. Overwhelmingly, learners in the control group selected, as their preference, an exam taken individually with books and notes. They felt that this method helped them really study for the exam, they really learned the material, other learners did not distract them, and the instructor would know they knew the material evidenced by the grade they earned on the exam.

The treatment group responded that the collaborative nature of the exam helped them at some level, with most participants responding that it helped a lot or completely.

Only one participant on all three exams stated it did not help at all and this student would have preferred to take the exam alone. Further, most participants responded that they tended to prefer this method of testing or wished they could take all exams collaboratively. Their greatest concern when taking an exam collaboratively was that other students would not come prepared. There was some concern that they would have to do all of the work and the nature of a collaborative exam would keep them from preparing properly. There was little to no concern about the perception that a collaborative exam felt like cheating or that they would be assigned a group grade. Comments supported their concern for lack of preparation on their part and the part of other members.

Learners in the treatment group indicated that a collaborative exam helped them understand the material better, and they liked working with others to solve problems. They further indicated that this method helped them develop a network of peers for future work. Their responses tended to be split for all three exams on whether the learner or the instructor should select the group members. There was not a strong preference for members being selected randomly versus based on ability or for groups changing versus staying the same for the entire semester. The general thought was that the optimal group size was three with four being the next highest selection.

The most interesting trend coming from the data is that the control group participants preferred individual testing and the treatment group preferred collaborative testing. The control group indicated few opportunities to test collaboratively. Likely, because of this lack of opportunity and therefore experience, learners in this group would

find difficulty in accurately assessing their preference for collaborative testing versus individual testing because they indicated that they had not participated in both. However, both groups indicated a strong preference for the method they used in the study, even though the treatment group had experience with both testing methods.

Group Feedback. In addition to the individual feedback from learners in both groups, the treatment group completed a Professional Skills Feedback survey (see Appendix C). An additional aspect of this study was to determine if learners perceived, and if they were observed practicing, criterial skills (Nelson, 1996) of the accounting profession. Each group completed the survey by coming to a consensus within the group as to the skills they felt they practiced during the exam. This survey was completed after each of the chapter exams and consisted of seven broad categories ("Perspectives on Education," 1989) as defined by the American Accounting Association and the Big 8 accounting firms.

In the general knowledge category, learner's selections close to an even split on the practice of general knowledge skills. They indicated that the practice of understanding/evaluation of personal values, morals, ethics, and or beliefs as the strongest specific skill. Observation by the instructor noted that this was selected because learners had to follow the spirit of a collaborative exam and work together. They also indicated that they understood and used other subjects, for example math and economics, to work collaboratively, and the instructor observed this.

Learners were perceived to practice and were observed practicing two of the five specific skills in the broader general knowledge category. This would be common for this

foundational course. There may be some cultural and historical perspective in the conceptual framework of this discipline, but this focus tends to be found more at the intermediate level. Additionally, learners would not be expected to be practicing the skill of appreciation of art, literature, and science, another specific topic in this category.

Of the five specific skills within the intellectual category, the treatment group felt that the ability to identify ethical issues and identify the possible consequences of their actions was practiced the least. The instructor, however, observed practice of this skill. Specifically, this skill was practiced as learners struggled to follow the guidelines and spirit of the collaborative exam. Learners may not have recognized this skill, but it was practiced as they clarified how the exams were to be taken and members were chided for moving ahead in the exam to work alone.

Learners were observed, and perceived themselves, as practicing all other specific skills in the category. Learners felt that the ability to reason, inquire, and/or critically analyze was practiced a lot during the exam or for the entire exam. This would be a common skill needed to be successful in both the educational and industry setting of accounting. Learners also felt that they practiced identifying problems, problem solving or helped in problem solving a lot during the exam or for the entire exam. Additionally, learners said they practiced identifying appropriate alternatives to solve problems and analyzed the consequences of these alternatives a lot during the exam or for the entire exam. The ability to meet stressful deadlines in an efficient and effective manner was said to be practiced some on the exam.

When asked to comment on the interpersonal skills, the participants agreed that they practiced these skills a lot during the exam or for the entire exam, with the exception of the ability to work in a group that is culturally and intellectually diverse. Although every attempt was made to assign students to groups based on their performance on the pretest or the previous chapter exam, this was not always possible. Participants' scheduling issues often necessitated re-arranging the groups and therefore re-distributing the intellectual diversity. The treatment group was not diverse as to gender (see Table 2 in chapter 4), nor was it diverse in ethnicity. It was diverse in age, enrolled program, and initial understanding of accounting.

Learners were observed and perceived themselves to practice the ability to work in a group, to lead and motivate, to discuss, argue, negotiate, and problem-solve. They also noted they practiced working in a group to delegate and organize along with agreeing that they practiced the ability to withstand and resolve conflicts in a group. Participants stated that they practiced these skills primarily a lot during the exam or for the entire exam.

The fourth of the seven broad categories was communication skills. Regarding the two specific skills in this category, ability to present, discuss, and defend views and the ability to listen effectively was practiced a lot during the exam or for the entire exam. The instructor would agree with this perception, and observed learners extensively practice these skills. These skills are foundational to collaborative learning (Bruffee, 1999) and support best practices in adult teaching methods (Brookfield, 1986; Ismat, 1998; Knowles & Associates, 1984; Merriam et al., 2007).

Participants felt that they practiced the specific skills within the organizational and business knowledge category some of the time during exams. These specific skills focused on understanding of basic finance, including analysis and markets, and understanding of change and growth within an environment. The instructor would agree that these skills would not be practiced on exams at the principles level of accounting.

Learners did note in this category that they practiced the two skills of understanding of general business and accounting workplace practices, along with the understanding of business workplace dynamics a little more often than the other two skills mentioned in the above paragraph. The instructor had opportunities to observe these skills being practiced some during each exam, but not as often as expected. This may be due to the fact that at this level of accounting, although critical thinking and problem solving skills are needed, they are not at a higher level of more advanced accounting courses.

Participants were observed to assume the answer was right if they all initially came to the same answer. This assumption was observed to be supported if the participants came to the same answer quickly. These assumptions would not likely happen in the professional workplace, as there would be individuals who would act as knowledge experts that would question the assumption that if everyone agrees it must be right. However, given the beginning level of accounting for this study this has been observed by the instructor over the years of teaching this course. Hübsche-Younger and Narayanan (2003) found similar results in their study. They point out that learners are

aware of students who are considered better and more knowledgeable and therefore grant them 'authority' in decision making when working collaboratively (p. 23).

Accounting knowledge is the sixth broad category in which participants were asked to respond. Participants perceived that some of the time on the chapter exams they thought about the history of accounting and the general accounting profession; policy, environmental, and regulation issues; and basic accounting concepts, reporting issues and understanding of the needs of users of information. The instructor would agree with the first two but disagree with the third. At this level of accounting, learners are practicing the application of basic accounting concepts and users needs throughout the entire course, and the learners were observed to practice this 100% of the time on each exam. The structure of the questions may have led participants to believe otherwise, or it may be attributed to their lack of understanding of what the subject of accounting really is.

In this sixth category, learners felt that they practiced apply accounting knowledge to real world problems and did not practice taxation concepts much or at all. The instructor would agree with their assessment of taxation, but not with their assessment of application to real world problems. Although exam questions attempt to replicate real life scenarios they often fall short, at least in accounting, as there is a known outcome, for example an answer for net income and a set of data to calculate this number. Whereas in the real world practitioners may not have all of the data and/or the data may not be correct from the client. Additionally, they will need to make judgment calls based on generally accepted accounting principles on the treatment of a line item that the textbook may not have presented. Again, this level of accounting tends to focus on the

technical aspects; students in higher levels of accounting would be presented with more real world scenarios.

When responding to the personal capacities and attitudes category, participants, more often than not, perceived themselves to have practiced each specific skill on a collaborative exam a lot during the exam or for the entire exam. These specific skills included creative thinking, integrity, energy, motivation, persistence, empathy, leadership, sensitivity to social responsibilities, and commitment to life-long learning. The instructor observed the practice of these skills, and found these skills to be the most practiced and the easiest to identify.

Specifically the nature of the collaborative exam was observed to increase motivation in completion of the exam and in dealing with difficult problems. The collaborative environment allowed learners to communicate encouragement to other learners, as well as knowledge content. On several occasions, it was observed that learners were empathetic toward their peers by providing the encouragement to persist in completion, by beginning again when a member was late, and through patiently explaining more than once, why they believed they were correct in their thinking. Most participants demonstrated leadership at some point during the exam by providing motivational words, persisting through the more difficult questions, being empathetic, and most importantly knowing when to listen to the other members and reconsider their original assumptions.

With the exception of one learner, all other participants were observed to relax and enjoy the collaborative exam, once they understood the expectations. Several stated

to the instructor that they looked forward to the next exam, wished they could work their exams for other classes in this manner, and even found it to be a fun way to take exams. Participants stated to the instructor that they were less stressed during the exam, and observations confirmed this.

Further, the instructor observed students managing conflict without the need for the instructor to intervene. Participants communicated well and responded well to criticism and to light-hearted humor. Although one student stated he did not like the collaborative method, he was observed to participate well overall even though there were a few occasions when his group was observed reminding him that he should work with the group and not ahead. This student indicated to the instructor that time constraints and family issues were some of the reasons for his preference to take the exam alone and on his own time. Trying to set up the appointment around other group members' schedules was difficult for this learner.

The instructor observed learners practicing criterial skills (Nelson, 1996), required for the successful accounting practitioner (Bloom, Heymann, Fuglister, & Collins, 1994), on collaborative exams. Participants in the treatment group were given the opportunity to practice, at some level, specific skills within each of the seven broad categories outlined by the American Accounting Association and the major accounting firms ("Perspectives on Education," 1998). Although the exam scores of the control and treatment group were not statistically different, the control group did not have the benefit of practice of skills necessary for practitioners in the accounting profession.

Final Exam

The final exam was a summative exam with the purpose of evaluating what students had learned during the semester. The final exam was given to all sections of this course at this institution, and all sections received the same exam. Students take the exam in the final week of classes and are not allowed to use any aids on the exam. The final exam consisted of 50 multiple-choice questions, agreed upon by the four full-time accounting faculty of the institution.

The *p*-value of .02 with an alpha of .05 on the final exam indicated a statistically significant difference between the control and treatment group, with the control group having higher final exam scores than the treatment group. This was surprising given that there were no statistically significant differences on the chapter exams. The results would indicate that the null hypothesis, there is no difference on overall final exam scores between students using collaborative testing versus traditional testing, should be rejected.

This final exam is a departmental exam designed to assess basic concepts of the subject. While these basic concepts could be memorized, it could be argued that learners in the treatment group should have had enough practice on the three chapter exams that the material should not have needed to be memorized. Chapter exams included multiple-choice questions similar to those the learners were given on the final exam. If the treatment group learners continued their pattern of little preparation for the exams, then they would not have been as successful as the control group. Collaborative evaluative assessments may not positively affect the exam scores on an individual summative assessment.

General Considerations

In the first accounting course there may be a focus on the technical aspect of accounting in an online format. As discussed in Chapter 2, instructors in this profession lean toward a focus on the technical. Likewise, learners will focus on the technical when taking the course online as this tends to be the focus of most textbooks and the most intimidating area of the course for learners. Here the control group may have relied more heavily on memorization of technical concepts to be successful, whereas the treatment group appeared to rely on other learners' knowledge and therefore failed to see the importance of their initial learning for the summative final exam.

Additionally, learners in foundational courses may not have practiced collaborative learning methods. If there is a large contingent of non-traditional learners, those learners past the traditional age of college students, the lack of experience may increase as may the resistance to collaborative methods of instruction, and more so with collaborative testing. In this study, learners in the treatment group were observed to struggle some with the collaborative method of testing, and no individual student indicated that they had been exposed to collaborative testing before. It took most individuals time to adjust to the other members in the group and feel comfortable with the working dynamic unique to each group for each exam. The outcome may have proven more positive if all learners had utilized collaborative opportunities with the online environment and at the least stayed in the same group for all three chapter exams.

Online learners may tend to shy away from collaboration. Developing an engaging, sustained learning community within the online environment requires

determination by the instructor and cooperation from the students. Certainly, the treatment group in this study resisted the first exam through complaints and needed clarification that they must work in a group. Learners continued to resist this method through failure to communicate with their group members and the instructor in setting an exam time, failure to show up on time, and in several instances, failure to show up at all. Two students felt that if they consistently did not show up they would be allowed to test individually and were alarmed to find this was not an option. In contrast, the control group learners showed no indication of resistance to on-campus testing. The treatment group learners may not have shown resistance either if they had been allowed to test individually.

Conclusions

This study evolved as a means of taking informal observations, during collaborative testing in this researcher's classrooms, and placing them in a scholarly context to determine if the informal observations where resulting in positive outcomes for learners. The study further evolved after the collaborative testing method was questioned and declared inappropriate as a method of formative assessment and certainly a summative evaluation in the postsecondary and adult education within this researcher's institution.

These two events triggered the research into alternative teaching, assessment, and evaluation methods and, more specifically, collaborative learning and testing. This interest set this researcher on the path to doctoral studies and culminated in this study. The study data supports scholarly literature concerning the area of practicing criterial

skills (Nelson, 1996) and how learners view testing, however, it does not support the literature in the positive outcomes for the individual summative exam or better scores on a formative assessment exam.

Collaborative Formative Exams

As noted previously, the study data indicated that there was no significant difference on formative chapter exams between the control and treatment groups. Breedlove, Burkett, and Winfield (2004) hypothesized that collaborative testing would have positive impact on test performance when used on basic concept and knowledge questions, and their conclusions supported this hypothesis. This study did not find the same outcome with regard to scores, and a trend did not develop for specific types of questions, i.e. multiple-choice, problem, or short answer, as having statistically significant differences for the two groups.

The studies conducted by Bloom (2006), Dallmer (2004), Lusk and Conklin (2002), and Mitchell and Melton (2003) saw improvement in grades. However, it should be noted that each of these studies used differing methods of comparison. For example, Bloom's study was conducted over a two-semester period with the first semester learners taking their exams individually on the first attempt and the re-taking the exam a second time, also individually but using books and notes. In the comparative second semester, learners took the exams individually and then again collaboratively.

Additionally, in 2003 Cortright et al., used a random crossover design, where learners alternated from individual to collaborative testing on a subset of questions. They also found that scores were improved when learners tested collaboratively. Rao, Collins,

and DiCarlo's (2002) study on various courses in a post baccalaureate medical program found that collaborative testing did promote increased learning.

What is common in all of these studies, and what is significant to the question of improved scores, is the face-to-face environment. Researchers in these studies and others (Crannell, 1999; Hite, 1999; Muir & Tracy, 1999; Shindler, 2002; Slusser, 2004; Zimbardo, Butler, & Wolfe, 2003), although using varying methods of research, all conducted their studies in a face-to-face environment. In this study, learners were in an online environment, and both tested on campus but the treatment group tested on campus collaboratively. This may be an indication of why this study did not see the same impact on the collaborative testing scores that other studies saw.

A majority of participants in the treatment group seemed primarily interested in the convenience of an online course and not in the development of a community of learners dependent on each other (Bruffee, 1999). In an attempt to develop collaboration and interdependence (Kreijins & Kirschner, 2002) in these groups, learners in both groups were asked to participate in 10 discussion board assignments. Additionally, they were provided with specific grading criteria. Neither group felt overly compelled to provide more than the minimum requirements of discussion, and often learners were given less than half of the points for only providing an initial post. Participants in both groups were also given the opportunity to complete a project collaboratively, and 100% of all participants chose to complete it independently.

As Ma (2009), notes concerning the combination of online learning and collaborative learning, higher-order thinking and reasoning are encouraged. However, the

online learning environment creates a unique set of issues for instructors. Although there were collaborative opportunities for the participants in this study, it was not a highly collaborative environment, and that may be necessary to support collaborative testing. The flaw here may be that learners, as Breedlove, Burkett, and Winfield (2004) suggest for face-to-face learners, need supporting collaborative instructional methods in order to see positive outcomes with collaborative testing.

Observation by the instructor indicates that learners failed to come as prepared for the collaborative exam as they would have if they were not taking the exam collaboratively, and this was especially true for the second and third chapter exams. This observation was also made in the study by Woody, Woody, & Bromley (2008), and it is a key argument of educators opposed to collaborative testing. However, several studies reported contrary observations (Duncan & Dick, 2000; Lusk & Conklin, 2002; Morgan, 2000; Muir & Tracy, 1999) and reported that learners came more prepared.

Summative Final Exam

In this study, the treatment group took formative chapter exams collaboratively. This is common to other studies (Cortright, Collins, Rodenbaugh, & DiCarlo, 2003; Davis & Dudley, 1997; Gammie & Matson, 2007; Meseke, Nafziger, & Meseke, 2008; Simkin, 2005) on collaborative testing. However, in this study participants followed up the chapter exams with a departmental final exam. Both groups of participants took the same exam administered individually in the institution's Academic Testing Center. Participants in the treatment group did not perform as well as those in the control group on the 50 multiple-choice questions given for this exam. In fact, there was a statistically

significant difference which indicates that the null hypothesis, there will be no statistically significant difference between the two groups, is rejected. Woody, Woody, & Bromley (2008) found no significant difference in retention of material between individual and collaborative test takers.

McKeachie (1986) in his reference to testing was concerned that instructors gave exams in a manner that required learners to memorize a set of facts, when in fact what they really wanted learners to do was develop a foundation for continued learning. The use of collaborative testing (Bloom, 2006; Bruffee, 1999; Hargreaves, 2007; McKeachie, Pintrich, Lin, & Smith, 1986) is argued to alleviate this concern. However, based on the data in this study, learners did not seem to be able to recall basic concepts from the collaborative exams for the final exam. The treatment group participants were made aware from the beginning of the course that they would test individually for the final exam, but they did not seem to understand the necessity of reviewing past concepts individually.

Terenzini et al. (2001) reported from case studies conducted that the collaborative environment does "produce both statistically significant and substantially greater gains in student learning than those associated with more traditional instructional methods" (p. 123). In this study, the use of the collaborative chapter exams combined with the traditional leaning online environment and the traditional summative final exam likely contributed to the poorer performance on the final exam. Treatment group participants may not have prepared as they normally would have for the traditional summative final exam.

Learner Perception of Success

On two out of the three chapter exams participants in the treatment group perceived that they did not perform as well as those in the control group. In contrast, on all three of the chapter exams, participants in the control group felt that they would get lower scores than those in the treatment group. The control group also reported spending more time studying for the exam than the treatment group, and this is consistent with the findings in the study by Woody, Woody, & Bromley (2008).

Participants in the treatment group were only given brief instruction on what a collaborative exam was and how to take it. The instructions were attached to the front of each exam for all three exams. Participants asked only a few questions on the first exam, and they focused on whether they each needed to complete an exam and whether they would receive individual or group grades. They were instructed to each complete an exam, were told that all members of the group did not have to have the same answer, and were assured that they would receive individual grades.

The role of the student is important in the collaborative environment, as well as in collaborative testing. The participants may have been at a disadvantage in understanding their role. As observed, they did not seem to have a full understanding of the necessity of interdependency (Bruffee, 1999) or did not feel overly obligated to fulfill commitments to the group, i.e. showing up late or not at all. Again, this is contradictory to the findings of other studies that observed learner preparedness and responsibility (Russo & Warren, 1999; Muir & Tracy, 1999). MacGregor (1992) stresses that learners must be taught how to learn collaboratively and notes that this may take some time. Treatment group

participants in this study may have been disadvantaged by the small amount of instruction and preparation on how to work collaboratively.

Additionally, Bruffee (1999) argues that meaningful communication promotes learning. In this study, the beginning level of the subject may not provide the right environment for meaningful communication, at least while test taking. Formative exams may need to be structured differently to promote discussion at this level and move from the technical aspects to the conceptual. However, learners for this study needed to be prepared to complete a departmental final exam on basic concepts of the subject.

Criterial Skills Necessary for Accounting Practice

One of the original reasons for conducting this study was to determine if learners were practicing criterial skills (Nelson, 1996) necessary for successful accounting practitioners. There has been much discussion and concern about accounting students leaving the educational environment with only technical skills (Albrecht & Sack, 2000; AAA, 1986; Nelson, 1996; Hargreaves, 2007). Educators in accounting have been called upon to teach not only the technical aspects but the criterial skills as well ("Perspectives on Education," 1989).

This study looked at the perceived practice of these skills from the participant view and from instructor observations. Additionally, generally a positive attitude about the collaborative exams was also observed and noted by the instructor. Marx (2006) argues that the practitioner environment has changed in the last decade and requires skill in social interdependency. While there are opponents of collaborative testing (Albrecht & Sack, 2000; Borthick et al., 2003; Panitz, n.d.) because of the need to clearly assess what

an individual student knows, the benefits of collaborative learning on practice of professional skills is hard to argue.

Much of the research on collaborative testing testifies to learners having a better attitude about the class, the subject matter, and the instructor (Bloom, 2006; Dallmer, 2004; Lusk & Conklin, 2002; Muir & Tracy, 1999; Simkin, 2005). Learners report and are observed to feel more engaged (Bloom, 2006; Lusk & Conklin, 2002; Muir & Tracy, 1999). These same observations were made during collaborative testing for this study. Participants in the treatment group were observed enjoying the exam, actively engaged through discussion, problem solving, and acting as teacher. The same participants commented, after the exams, that they would not have been able to complete the exam as successfully if they had been on their own.

Although studies have not specifically addressed criterial (Nelson, 1996) or professional skills, observation of active engagement through discussion, problem solving, and learners acting as teacher would suggest that they exist, as active engagement in the learning process requires motivation, persistence, critical thinking, and many other professional skills. Participants in the treatment group perceived that they were practicing, at some level, all of the seven broad categories of skills suggested by the Accounting Education Change Commission's Composite Profile of Capabilities Needed by Accounting Graduates (Appendix A). Further, the instructor observed treatment group participants practicing these skills consistently on collaborative exams. It may be possible to see more depth of practice at higher levels of the subject when learners are more mature in their problem solving abilities and are at a higher level of critical thinking.

Additionally, learners in more advanced courses are adding to the basic technical understanding by working through more unstructured problems.

Recommendations

Recommendations for Practice

Although in this study collaborative testing did not show a statistically significant difference on chapter exams from control to treatment group and the data would lead to rejection of the null hypothesis, many studies consistently report the positive outcomes of collaborative testing (Crannell, 1999; Hite, 1999; Muir & Tracy, 1999; Shindler, 2002; Slusser, 2004; Zimbardo, Butler, & Wolfe, 2003). Instructors wanting to incorporate collaborative testing should note that the difference between the above studies and this study was the face-to-face environment, and often there was a test and re-test method used in the other studies.

It is suggested that instructors be mindful that learners will likely be more successful on collaborative tests when they are supported by a collaborative environment (Terenzini et al., 2001). Additionally, this collaborative environment supports and enforces the social interdependency (Bruffee, 1999) necessary for successful collaborative groups. This study was conducted using two online sections of the same course making social interdependency challenging for the learners and the instructor. The consideration for practice, in this regard, is that instructors will need to be intentional in creating collaborative learning and instructional methods online so students will have learned how to operate successfully on a collaborative exam.

Instructors who desire to provide opportunities for not only the technical aspect of the subject but help learners understand the skills necessary for practitioners will find collaborative testing helpful. Students generally recognize tests as high stakes assessments (Bloom, 2006; Bruffee, 1999; McKeachie, Pintrich, Lin, & Smith, 1986) and therefore will take them more seriously than day-to-day activities, thereby providing greater opportunity to practice criterial (Nelson, 1996) or practitioner skills.

Although, this researcher did not find the same positive outcomes on grades as other studies it was apparent that learners were actively engaged in learning, a key requirement for adult learners (Knowles & Associates, 1984). Additionally, learners had a more positive attitude, stated they learned more, and enjoyed the exam more than when taking an individual exam. At minimum, a basic level of interdependency was observed, and instructors may want to consider this when assigning and re-assigning groups as greater interdependency may be created when learners are allowed to work in the same group consistently.

Recommendations for Theory

This study grew out of this researcher's interest in alternative teaching and testing methods in adult education. The researcher began teaching in a traditional discipline using traditional methods, as was modeled by the researcher's instructors. In an effort to motivate and instill a desire for students to want to learn the researcher began to include several methods rarely used in this discipline, including the use of manipulatives, games, computer simulations, Internet, and collaboration. This experimentation led to inclusion

of collaboration in testing. However, the need to assess learning using this testing method was a key motivator for conducting this study.

This study provides additional insight into the instructional method of collaborative learning and testing, along with the supporting theories of andragogy, cognitive constructivism, and social constructivism. Collaborative learning provides opportunities for discussion, disagreement, and consensus building among learners. Well-designed activities develop interdependency among learners by placing them in situations that will create constructive conflict and disagreement (Bruffee, 1999). These situations then offer opportunities to develop learner skills in communication, negotiation, teambuilding, conflict management, and various other essential traits of successful learners.

In this study, during the treatment chapter exams, learners were observed to be collaboratively learning by discussing, disagreeing, and building consensus. However, the data in this study indicates that learners did not perform statistically significantly better than learners who did not collaborate. Bruffee (1999) suggested that through collaborative learning students begin to consider biases and assumptions and extend learning through conversation, either written or spoken.

The conversation promotes the deepest learning and change takes place in groups or communities. Each learner comes from one community culture and works with others to create a new culture through collaborative learning. Through interaction in the culture, or as Bruffee (1999) termed it, reacculturation, students learn how to become productive in the new culture. Within this newly formed community, learners practice, through

discussion and activities, the accepted behaviors, vocabulary, and tenets of a specialization. The lack of community development in the online environment likely was a detriment to the reacculturation process. Additionally, learners in the treatment group had to develop a new community each testing session, creating an obstacle to reacculturation.

Tinzmann et al. (1990) suggested that the role of the instructor as mediator, but also knowledge expert, is a key strategy in the collaborative process. In this study, the online learners worked with the instructor on a limited basis. Although, the instructor was available, few students took advantage of the expertise, and when they did, it was on a limited basis. Although in collaborative learning instructors are no longer the focus of the learning process, they are still crucial to the process. As the knowledge experts, they guide newly developing communities in the direction common to those who are in practice, modeling the expectations of the profession. The instructor, in this study, did not participate in the testing process, other than to answer questions on the testing technique. This lack of mediation may have additionally deterred the collaboration process as some groups may have assumed that if they all got the same answer, then the answer must be correct.

For collaborative learning to achieve its potential students should be provided with learning opportunities that promote cognitive and social interdependence. This interdependence may be developed through Knowles' set of six assumptions about adult learning or andragogy: a) adults move from being other-directed to self-directed in learning, b) experience is accumulated and enhances learning, c) learning is based on

social roles, d) the focus of learning is immediate application, e) motivation to learn comes from within, and f) adult learners must be able to understand why they need to learn (Merriam, Caffarella, & Baumgartner, 2007). The collaborative testing method used in this study promoted cognitive and social interdependency among the members. Learners quickly adapted to being self-directed, although on the first chapter exam for the treatment group it was observed that they were hesitant, but once being reassured by the instructor they were perceived to enjoy the freedom of collaboration.

It was further observed that learners came to understand that the accumulation of experience may improve their scores and can lead to learning where there was a previous knowledge gap. In relation to social roles, the primary role that developed was that of the perceived smarter student. This created a situation where it appeared that some members agreed to an answer simply because they assumed brighter student would be correct. Of the other six assumptions by Knowles (Merriam, Caffarella, & Baumgartner, 2007) learners at this level of accounting generally find it difficult to find immediate application or to understand why they need this information. Many learners in the first accounting course have little experience in the discipline to bring to the community and therefore are not sure how or why this relates to them personally. Learners have been observed to express that they do not need this course and are taking it because it is a requirement, which may explain the lack of intrinsic motivation observed during testing. It may also explain the lack of study reported on later chapter exams by the treatment group.

Constructivism is a theory of learning which asserts that learners construct knowledge through communication and discussion in light of what they know. There are

several branches of constructivism, two of which are social and cognitive. What is common to both branches of constructivism is active participation by learners, building on what they already know and using it to construct new knowledge (Hausfather, 2001). Learners will use the activity to develop a framework for future application to unstructured problems. While participants were actively engaged in the collaborative testing process, at this beginning level, individual testing followed by collaborative testing may provide a greater benefit. The instructor and the learners may then have opportunities to assess what they know and therefore isolate learning gaps. This testing design may then allow the instructor to create more effective heterogeneous groups and provide the learner with a greater comfort level to share their experience and further allow other learners to contribute.

Recommendations for Further Research

It is important to note that this study was conducted in the first course in accounting, and students are generally using skills at a basic level. It is the researcher's belief that the use of collaborative exams may be more beneficial and would return better results if this same study were conducted in upper division courses that require higher levels of critical thinking and problem solving. These higher levels would likely prompt richer discussion within the groups. Observations and learners' perception of practice of criterial skills (Nelson, 1996) would likely be more positive and include more of the topics within the seven broad categories, again because of the need for use of higher critical thinking and problem solving skills.

Different outcomes might result if the study were repeated in two online sections supported by additional collaborative instructional methods. However, a study conducted in two face-to-face courses where the instructor has the ability to ensure that learners are provided opportunities to experience collaborative instructional methods would provide additional knowledge of the impact of collaborative testing on summative assessments. Face-to-face learners would not resist the on campus testing, as that is generally the testing format for this mode of delivery.

Final Summary

Collaborative testing during evaluative assessment provides the same results as the same assessment given individually, at least in an online environment with fewer non-collaborative instructional methods. The biggest benefit to collaborative testing is the perception of the learner's success on the assessment, the reduction of anxiety, and the motivation to spend more time critically thinking about the questions and completing the exam. Additionally, learners perceive they are practicing criterial skills (Nelson, 1996) of the profession and are observed to practice these same skills. Collaborative testing, at the foundational course level, may not provide enough mastery of the basic concepts of the subject to improve scores on a summative assessment.

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APPENDIX A. SELECTED ISSUES AND POSITION STATEMENTS OF THE AMERICAN ACCOUNTING ASSOCIATION

Position Statement Number One
Objectives of Education for Accountants
September 1990

The Accounting Education Change Commission was appointed in 1989 by the American Accounting Association and supported by the Sponsors' Education Task Force, representing the largest public accounting firms in the United States. Its objective is to be a catalyst for improving the academic preparation of accountants so that entrants to the accounting profession possess the skills, knowledge, and attitudes required for success in accounting career paths.

OBJECTIVES OF EDUCATION FOR ACCOUNTANTS

The purpose of this Statement is to set out the Commission's views on the objectives of Education for accountants. The Commission believes such a statement will provide a focus for those participating in the work of improving accounting education.

The Commission's aim is to enlist the cooperation and creativity of the academic community and other stakeholders to bring about needed changes in accounting education. The need for changes has arisen because accounting programs have not kept pace with the dynamic, complex, expanding, and constantly changing profession for which students are being educated. The need has been documented in "Future Accounting Education: Preparing for the Expanding Profession" (the Bedford Committee Report) and "Perspectives on Education: Capabilities for Success in the Accounting Profession".

The Commission defines the accounting profession broadly. It includes career paths in public accounting as practice in large, medium, and small firms, corporate accounting (including financial management, controllership, treasury, financial analysis, planning and budgeting, cost accounting, internal audit, systems, tax, and general accounting), and government and nonprofit accounting.

DESIRED CAPABILITIES

Accounting programs should prepare students to **become** professional accountants, not to **be** professional accountants at the time of entry to the profession. At the time of entry, graduates cannot be expected to have the range of knowledge and skills of experienced professional accountants. To attain and maintain the status of a professional accountant requires continual learning. Therefore, pre-entry education should lay the base on which life-long learning can be built. In other words, graduates should be taught how to learn. The base on which life-long learning is built has three components: skills, knowledge, and professional orientation.

Skills

To become successful professionals, accounting graduates must possess communication skills, intellectual skills, and interpersonal skills. Communication skills include both receiving and transmitting information and concepts, including effective reading, listening, writing, and speaking. Intellectual skills include the ability to locate, obtain and organize information and the ability to identify and solve unstructured problems in unfamiliar settings, and to exercise judgment based on comprehension of an unfocused set of facts. Interpersonal skills include the ability to work effectively in groups and to provide leadership when appropriate.

Knowledge

Accounting graduates should have general knowledge, organizational and business knowledge, and accounting knowledge. General knowledge will help accounting professionals to understand the complex interdependence between the profession and society and to interact with diverse groups of people. Such general knowledge should include an appreciation of the flow of ideas and events in history, an awareness of the different cultures and socio-political forces in today's world, a broad understanding of mathematics and economics, and an aesthetic sensibility. It will lead to an improved understanding of the world-wide economic, political, and social forces affecting society and the profession.

Professional accountants must understand the work environments found in organizations. They must understand the basic internal workings of organizations and the methods by which organizations change. Because organizations are affected by rapidly increasing

dependency on technology, accounting professionals must understand the current and future roles of information technology in organizations.

A strong fundamental understanding of accounting is necessary for successful accounting careers. This understanding includes 1) the ability to identify goals, problems, and opportunities, 2) the ability to identify, gather, measure, summarize, verify, analyze, and interpret financial and nonfinancial data that are useful for addressing the goals, problems, and opportunities, and 3) the ability to use data, exercise judgments, evaluate risks, and solve real-world problems. The focus should be on developing analytical and conceptual thinking, not on memorizing professional standards.

Professional Orientation

Accounting graduates should identify with the profession and be concerned with developing the knowledge, skills, and values of its members. They should know and understand the ethics of the profession and be able to make value-based judgments. They should be prepared to address issues with integrity, objectivity, competence and concern for the public interest.

COURSES AND COURSE CONTENT

The overriding objective in developing course content should be to create a base upon which continued learning can be built. Professional accounting education has four components: general education, general business education, general accounting education, and specialized accounting education. The components can be addressed in a variety of ways. No one model of accounting education will be appropriate for all colleges and universities. Nevertheless, some minimum coverage of all four areas, including integration of the areas, should be part of the education of every accountant.

General Education

The curriculum for general education should develop in students the capacities for inquiry, abstract logical thinking, and critical analysis, and should train them to understand and use quantitative data. It should improve their writing to the degree that they can perform at the level acceptable for professional accountants and should give them some awareness of the ingredients of sound research. It should develop speaking and listening skills, historical consciousness, international and multicultural knowledge, an appreciation of science, and the study of values and their role in decision making. And it should include the esthetic experience. This goal will not be met by a random set of courses. Some structured set of courses is required, but the structure should not be overly restrictive.

General Business Education

Professional accountants must understand the environments in which they work. Accounting programs should therefore include courses designed to develop knowledge of the functional activities of business, government, and nonprofit organizations. The courses should cover finance, marketing, operations, organizational behavior, and how the general manager integrates all these functions.

The introductory accounting course should be given special attention. It must serve the interests of students who are not going to enter the profession as well as those who are. The broad approach recommended in these objectives serves the interests and needs of both groups. The course should teach, reinforce, and reward the skills, abilities, and attitudes that are necessary for success in the accounting profession. This will give students accurate knowledge about the nature of accounting careers, which will help them make a well informed choice about entering the profession.

General Accounting Education

Accounting courses should present accounting as an information development and communication process. The central theme should be how information is identified, measured, communicated, and used. The courses' essential components should be: 1) decision making and information in organizations, 2) design and use of information systems, 3) financial information and public reporting including attestation, and 4) knowledge of the accounting profession. Courses should focus on both basic concepts and the application of these concepts in real-world environments, including international and ethical issues.

Specialized Accounting Education

Specialized accounting education should follow only after attainment of general accounting, organizational, and business knowledge. Therefore, it should be offered primarily at the post-baccalaureate level and via continuing education. Specialized accounting programs may include advanced study in financial accounting, management accounting, taxation, information systems, auditing, government (or nonprofit) accounting, and international accounting.

Continuing professional education may overlap considerably with specialized accounting education offered by universities. The principle of comparative advantage should govern which types of specializations are offered by universities and which by others.

INSTRUCTIONAL METHODS

The overriding objective of accounting programs should be to teach students to learn on their own. Therefore, accounting programs should not focus primarily on preparation for

professional examinations. Students should be taught the skills and strategies that help them learn more effectively and how to use these effective learning strategies to continue to learn throughout their lifetimes.

Students must be active participants in the learning process, not passive recipients of information. They should identify and solve unstructured problems that require use of multiple information sources. Learning by doing should be emphasized. Working in groups should be encouraged. Creative use of technology is essential.

Accounting classes should not focus only on accounting knowledge. Teaching methods that expand and reinforce basic communication, intellectual, and interpersonal skills should be used.

Faculty must be trained to apply appropriate instructional methods. Doctoral programs therefore should give more attention to teaching methods. Faculty who are effective teachers and those who develop and implement new or innovative approaches to teaching and curriculum design should be recognized and rewarded for such scholarly activities.

Knowledge of historical and contemporary events affecting the profession is essential to effective teaching. It allows teachers to make lessons more relevant and to lend a real-world perspective to their classroom. Faculty should therefore have current knowledge of the profession and its environment. Incentives should motivate faculty to be knowledgeable about and involved in the current professional accounting environment.

Instructional methods and materials need to change as the environment changes. Measurement and evaluation systems that encourage continuous updating and improvement of instructional methods and materials should be developed.

LEARNING TO LEARN

Learning is often defined and measured in terms of knowledge of facts, concepts, or principles. This "transfer of knowledge" approach to education has been the traditional focus of accounting education. One goal of the Accounting Education Change Commission is to change the educational focus from knowledge acquisition to "learning to learn," that is, developing in students the motivation and capacity to continue to learn outside the formal educational environment. Learning to learn involves developing skills and strategies that help one learn more effectively and to use these effective learning strategies to continue to learn throughout his or her lifetime.

Academic programs focused on teaching students how to learn must address three issues: 1) content, 2) process, and 3) attitudes.

The **content** of the program must create a base upon which continued learning can be built. Developing both an understanding of underlying concepts and principles and the ability to apply and adapt those concepts and principles in a variety of contexts and circumstances are essential to life-long learning. A focus on memorization of rules and regulations is contrary to the goal of learning to learn.

The **process** of learning should focus on developing the ability to identify problems and opportunities, search out the desired information, analyze and interpret the information, and reach a well reasoned conclusion. Understanding the process of inquiry in an unstructured environment is an important part of learning to learn.

Above all, an **attitude** of continual inquiry and life-long learning is essential for learning to learn. An attitude of accepting, even thriving on, uncertainty and unstructured situations should be fostered. An attitude of seeking continual improvement, both of self and the profession, will lead to life-long learning.

COMPOSITE PROFILE OF CAPABILITIES NEEDED BY ACCOUNTING GRADUATES

1. General Knowledge
    - An understanding of the flow of ideas and events in history and the different cultures in today's world.
    - Basic knowledge of psychology, economics, mathematics through calculus, and statistics.
    - A sense of the breadth of ideas, issues, and contrasting economic, political and social forces in the world.
    - An awareness of personal and social values and of the process of inquiry and judgment.
    - An appreciation of art, literature, and science.

2. Intellectual Skills
    - Capacities for inquiry, abstract logical thinking, inductive and deductive reasoning, and critical analysis.
    - Ability to identify and solve unstructured problems in unfamiliar settings and to apply problem-solving skills in a consultative process.
    - Ability to identify ethical issues and apply a value-based reasoning system to ethical questions.
    - Ability to understand the determining forces in a given situation and to predict their effects.
    - Ability to manage sources of stress by selecting and assigning priorities within restricted resources and to organize work to meet tight deadlines.

3. Interpersonal Skills
    - Ability to work with others, particularly in groups, to influence them, to lead them, to organize and delegate tasks, to motivate and develop people, and to withstand and resolve conflict.
    - Ability to interact with culturally and intellectually diverse people.

4. Communication Skills
    - Ability to present, discuss, and defend views effectively through formal and informal, written and spoken language.
    - Ability to listen effectively.
    - Ability to locate, obtain, organize, report, and use information from human, print, and electronic sources.

5. Organizational and Business Knowledge
    - A knowledge of the activities of business, government, and nonprofit organizations, and of the environments in which they operate, including the major economic, legal, political, social, and cultural forces and their influences.
    - A basic knowledge of finance, including financial statement analysis, financial instruments, and capital markets, both domestic and international.
    - An understanding of interpersonal and group dynamics in business.
    - An understanding of the methods for creating and managing change in organizations.
    - An understanding of the basic internal workings of organizations and the application of this knowledge to specific examples.

6. Accounting Knowledge
    - History of the accounting profession and accounting thought.
    - Content, concepts, structure, and meaning of reporting for organizational operations, both for internal and external use, including the information needs of financial decision makers and the role of accounting information in satisfying those needs.
    - Policy issues, environmental factors, and the regulation of accounting.
    - Ethical and professional responsibilities of an accountant.

- The process of identifying, gathering, measuring, summarizing, and analyzing financial data in business organizations, including:
  - The role of information systems
  - The concepts and principles of information system design and use
  - The methods and processes of information system design and use
  - The current and future roles of computer-based information technology
- The concepts, methods, and processes of control that provide for the accuracy and integrity of financial data and safeguarding of business assets.
- The nature of attest services and the conceptual and procedural bases for performing them.
- Taxation and its impact on financial and managerial decisions.
- In-depth knowledge in one or more specialized areas, such as financial accounting, management accounting, taxation, information systems, auditing, nonprofit, government, and international accounting.

7. Accounting Skills
   - Ability to apply accounting knowledge to solve real-world problems.

8. Personal Capacities and Attitudes
   - Creative thinking
   - Integrity
   - Energy
   - Motivation
   - Persistence
   - Empathy
   - Leadership
   - Sensitivity to social responsibilities
   - A commitment of life-long learning
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Position Statement Number Two
The First Course in Accounting
June 1992

This Statement is issued by the Accounting Education Change Commission (AECC). The AECC was appointed in 1989 by the American Accounting Association and supported by the Sponsors' Education Task Force, representing the largest public accounting firms in the United States. Its objective is to be a catalyst for improving the academic preparation of accountants so that entrants to the accounting profession possess the skills, knowledge, and attitudes required for success in accounting career paths.

THE FIRST COURSE IN ACCOUNTING

In its first Position Statement[1] the Commission outlined the knowledge, skills, and orientation accounting graduates must possess to become successful professionals. This Statement builds upon that foundation by presenting the Commission's views on the first course in accounting.[2]

The concepts in this Statement apply directly to the first course in accounting at the undergraduate level. However, they are also applicable to courses in introductory accounting at the graduate level.

THE IMPORTANCE OF THE FIRST COURSE IN ACCOUNTING

The first course in accounting can significantly benefit those who enter business, government, and other organizations, where decision-makers use accounting information. These individuals will be better prepared for their responsibilities if they understand the role of accounting information in decision-making by managers, investors, government regulators, and others. All organizations have accountability responsibilities to their constituents, and accounting, properly used, is a powerful tool in creating information to improve the decisions that affect those constituents.

The first course has even more significance for those considering a career in accounting and those otherwise open to the option of majoring in accounting. The course shapes their perceptions of (1) the profession, (2) the aptitudes and skills needed for successful careers in accounting, and (3) the nature of career opportunities in accounting. These perceptions affect whether the supply of talent will be sufficient for the profession to thrive. For those who decide to major in accounting or other aspects of business, the course in an important building block for success in future academic work.

OBJECTIVE OF THE FIRST COURSE IN ACCOUNTING

The primary objective of the first course in accounting is for students to learn about accounting as an information development and communication function that supports economic decision-making. The knowledge and skills provided by the first course in accounting should facilitate subsequent learning even if the student takes no additional academic work in accounting or directly related disciplines. For example, the course should help students perform financial analysis; derive information for personal or organizational decisions; and understand business, governmental, and other organizational entities.

In achieving this objective, students completing the first course in accounting should—

- Have a broad view of accounting's role in satisfying society's need for information and its function in business, in government, in other organizations, and in public accounting.
- Students should gain an overview of the accounting profession, encompassing its history, its ethics, its public responsibilities, and its international dimensions as well an appreciation of the role of auditing in enhancing the credibility of publicly reported information.
- Understand the basic features of accounting and reporting by organizations, including the principles underlying the design, integrity, and effectiveness of accounting information systems.
- Understand fundamental accounting concepts in addition to the elements of financial statements. These concepts include accountability, estimation, accounting judgment (for example, substance vs. form), the qualitative characteristic of accounting information, performance measurement (including productivity and quality), choice in accounting measurement (for example, defining profit centers and other units of accountability), accounting controls and processes, and the ethics of internal and external reporting.
- Appreciate the role of accounting in both the generation of taxes and preparation of economic measurements, by and for governmental bodies.
- Understand that some accounting systems are more effective than others in given circumstances and that the decision-usefulness of information produced by an accounting system depends on its design and choices among information capturing, analysis, and reporting options.
- Possess enhanced analytical skills and the ability to confront unstructured problems—that is, problems with more than one defensible solution.
- Gain an appreciation that accounting as a discipline is the focus of constructive debate and intensive re-thinking caused by economic and technological change, and one that will continue to evolve in the future.
- In general, the first course in accounting should be an *introduction to accounting* rather than *introductory accounting.* It should be a rigorous course focusing on the relevance of accounting information to decision-making (use) as well as its source (preparation).

TEACHING METHODS

Teachers of the first course in accounting should put a priority on their interaction with students and on interaction among students. Students' involvement should be promoted by methods such as cases, simulations, and group projects. Emphasis should be on teaching the student to learn on his or her own.

FACULTY

The commitment of faculty resources[3] to the first course in accounting should be consistent with its foundational importance to the curriculum. The most effective instructors should teach the course.

Those who teach the course should have a record of success in teaching, should have up-to-date knowledge of professional developments, should be able to support points by citing relevant research, should be able to bring an integrative organizational perspective to the course, and should be able to reinforce the relevance of the course to the students by examples from the non-academic work of the accounting profession. These qualifications should be supplemented by enthusiasm and commitments to teaching and the accounting profession.

CONCLUSION

The first course in accounting is very important to all who take it, whether they plan to become professional accountants or to use accounting information in non-accounting careers. If designed according to this Statement, the course can meet the educational needs of these students, engender accurate perceptions of the broad role of accounting in modern economies, and assist students in making well-informed career choices. The breadth of this influence increases the responsibility of every party capable of improving the effectiveness of the first course in accounting.

Other Statements issued by the Accounting Education Change Commission:

Issues Statement No.1: *AECC Urges Priority for Teaching in Higher Education* (August 1990).

Position Statement No. One: *Objectives of Education for Accountants* (September 1990).

Issues Statement No. 2: *AECC Urges Decoupling of Academic Studies and Professional*

Accounting Examination Preparation (July 1991).

Issues Statement No. 3: *The Importance of Two-Year Colleges for Accounting Education*

(August 1992).

[1] Position Statement No. One: *Objectives of Education for Accountants* (September 1990). The views expressed in this Statement should be considered in conjunction with Position Statement No. One.

[2] "First course in accounting" refers to the introductory accounting sequence, usually taught over two terms (e.g., introductory "financial" and "managerial" accounting).
[3] Position Statement No. One: *Objectives of Education for Accountants* (September 1990, 5), states, "Faculty who are effective teachers and those who develop and implement new or innovative approaches to teaching and curriculum design should be recognized and rewarded for such scholarly activities." See also Issues Statement No. 1: *AECC Urges Priority for Teaching in Higher Education* (August 1990).

Issues Statement Number 3
The Importance of Two-Year Colleges for Accounting Education
August, 1992

This Statement is issued by the Accounting Education Change Commission (AECC). The AECC was appointed in 1989 by the American Accounting Association and supported by the Sponsors' Education Task Force, representing the largest public accounting firms in the United States. Its objective is to be a catalyst for improving the academic preparation of accountants so that entrants to the accounting profession possess the skills, knowledge, and attitudes required for success in accounting career paths.

The Accounting Education Change Commission recognizes the important role of two-year colleges in accounting education. Over half of all students who take the first course in accounting do so at two-year colleges.[1] Approximately one-fourth of the students entering the accounting profession take their initial accounting coursework at two-year colleges. The proportion of students who begin their college education at two-year colleges is increasing.[2] Therefore, the quality of education provided by two-year colleges has an important effect on the overall quality of accounting education.

The commission encourages closer coordination between two- and four-year colleges in the development of accounting curricula. Enhanced communication between accounting faculty and administrators at two-year and four-year colleges is likely to increase the quality of accounting education at both levels. By working together, accounting faculty at two-year and four-year colleges can understand better the backgrounds and expectations of their students. The better informed the faculty at the two-year colleges, the better they can help their students prepare for the programs to which they are going to transfer. A cooperative effort should attract better students to accounting.

Accounting administrators of two-year and four-year accounting programs should maintain contact with each other. Administrators at two-year colleges should identify four-year colleges to which their students transfer, and administrators at four-year colleges should identify two-year colleges from which their students transfer. Interactions through advisory boards, curricula committees, and joint faculty meetings should be encouraged.

Information about curricula admissions, syllabi, and examinations should be exchanged to improve coordination of program requirements. Exchange of information is particularly important when curricula changes are considered. Sharing programs and materials designed to improve teaching, information about curriculum design and course development efforts, and ideas about how to recruit top students into accounting programs can enhance the quality of both two-year and four-year programs.

The Commission believes that the involvement of two-year colleges in accounting education change is critical for improving the overall quality of accounting education. It encourages greater recognition within the academic and professional communities of the efforts and importance of two-year accounting programs.

Previous Statements issued by the Accounting Education Change Commission:

Issues Statement No. 1: *AECC Urges Priority for Teaching in Higher Education* (August 1990).

Position Statement No. One: *Objectives of Education for Accountants* (September 1990).

Issues Statement No. 2: *AECC Urges Decoupling of Academic Studies and Professional Accounting Examination Preparation* (July 1991).

Position Statement No. Two: *The First Course in Accounting* (June 1992).

[1] The Commission's opinion that the first course is critical to the quality of accounting education has been expressed in its Position Statement No. Two, *The First Course in Accounting.*

[2] These conclusions are based on results of surveys of members of the American Institute of Certified Public Accountants and Institute of Management Accountants and a survey of administrators of accounting programs at four-year schools by the Commission in the Spring, 1992.

Issues Statement Number 4
Improving the Early Employment Experience of Accountants

April, 1993

This Statement is issued by the Accounting Education Change Commission (AECC). The AECC was appointed in 1989 by the American Accounting Association and supported by the Sponsors' Education Task Force, representing the largest public accounting firms in the United States. Its objective is to be a catalyst for improving the academic preparation of accountants so that entrants to the accounting profession possess the skills, knowledge, and attitudes required for success in accounting career paths. The Commission encourages reproduction and distribution of its statements.

The purpose of improving the academic preparation of accountants is to serve jointly the interests of accounting graduates, their employers, and those who rely on their work. This purpose is undone whenever the early employment experience discourages dedication to accounting as a career, dampens enthusiasm for life-long professional learning, or leads to performance beneath one's abilities. On the other hand, the same purpose is furthered by an experience that nourishes dedication, sparks enthusiasm, and improves abilities. Thus the early employment experience affects the productivity of educational assets acquired at colleges and universities. This is true of all career paths in accounting practice, whether in public accounting, in corporations, or in government and other nonprofit entities.

This Statement is directed to all the parties whose activities directly affect the early employment experience. Each can do a part to alleviate problems and improve results.

THE CURRENT EXPERIENCE

Recent studies indicate that many accounting graduates find that their early employment experience falls short of the expectations they had brought to the business world. Many find that their expectations butt head-on into unanticipated overtime, deadlines, budgets, diminished family time, job stress, and less-than-desired financial rewards. Although evidence shows that many young accountants appreciate the diversity of their job assignments, opportunities to develop business skills, technical challenges, and collegial experiences, unmet expectations nevertheless reduce the attractiveness of careers in the profession and of majors in accounting.

ECONOMIC CONSTRAINTS

The profession's economic environment constrains the options available to improve the early employment experience. Yet new hires, educated with the increased breadth this Commission believes necessary to prepare them for practice, will demand more of the early employment experience than have past graduates. Thus, despite economic constraints, the early employment experience must be addressed or it will get worse. The Commission believes it can be addressed through the practicable recommendations set out below.

RECOMMENDATIONS

Recommendations to improve the early employment experience cannot succeed unless they are in the interest of the parties who must take recommended actions. Fortunately, the parties who affect the early employment experience have an interest in improving it. This is most obvious in the case of students, but no less so in the case of employers. Satisfied personnel are more productive, and disgruntled personnel undermine the teamwork needed to perform today's accounting. Faculty are already engaged in helping students prepare for success in accounting careers. Measures that can help graduates prosper in the work environments they enter should therefore engage professors' interests and are consistent with the purposes of the curricular reform activity they are pursuing with the encouragement of this Commission.

The recommendations address students' preparation for the early employment experience, recruiting, and the early years of employment. An appendix provides examples of how each recommendation might be effected.

Faculty members should;

- Acquire and maintain a high level of knowledge about both practice issues and the nonacademic accountant's workplace.
- Seek out opportunities to interact with practicing accountants.
- Communicate knowledge about the conditions of practice to students.

Students should;

- Seek opportunities to obtain first-hand knowledge of the business world and practice environment.
- Obtain information about career opportunities and the job search.

Career planning and placement professionals should;

- Organize career education programs.
- Counsel students on career issues.

Recruiters should;

- Acquire and maintain high levels of knowledge about educational and early employment issues.
- Communicate accurately and fully about the early employment experience.

Supervisors of early work experience should;

- Provide strong leadership and mentoring for staff members.
- Build working conditions that are conducive to success.
- Provide challenging and stimulating work assignments.

Workplace educators of first- through third-year employees should;

- Select and design educational experiences based on knowledge of employees' needs.
- Reinforce important skills.

Employer management should;

- Acquire and maintain knowledge of the early employment experience.
- Promote working conditions that junior employees find attractive, nurturing, and stimulating.
- Help fulfill the other recommendations in this Statement.

CONCLUSION

The recommendations above make clear that all parties to the early employment experience can contribute to improving it. The Commission therefore urges all such parties to act on the recommendations addressed to them and to consider the advantages in taking such steps.

EXAMPLES OF HOW THE PARTIES CAN AFFECT THE RECOMMENDATIONS

Faculty

Faculty members should acquire and maintain a high level of knowledge about practice issues and the nonacademic accountant's workplace.

- Read journals that cover changes in the practice environment.
- Participate in faculty internships (compensated employment as a professional accountant) that provide experience in current business and professional issues and decision making.

- Request information from employers about the work environment.
- Attend recruiting events on campus and discuss issues with employer's representatives.

Faculty members should seek out opportunities to interact with practicing accountants.

- Become active in professional organizations that serve practitioners (for example, the American Institute of Certified Public Accountants, state CPA societies, the Institute of Management Accountants, the Financial Executives Institute, the Institute of Internal Auditors, and the Federal Government Accountants' Association).
- Instruct continuing professional education seminars and/or executive education sessions for employers.
- Invite practicing accountants and executives to participate in classes (including interactive discussions of practice issues).
- Attend employer-sponsored educational events to become knowledgeable about current issues. Visit employer organizations to become better acquainted with business issues and the work environment.
- Engage in cooperative research projects with practitioners on professional accounting issues. Faculty members should communicate knowledge about the conditions of practice to students.
- Develop case materials for classroom use that convey a realistic picture of the practice environment.
- Incorporate information on the practice environment in other curricular materials.
- Familiarize students with the typical responsibilities of the new employees and the need to be able to perform well when responsible for a part, rather than the whole, of a large project or engagement.
- Employ practicing accountants as adjunct professors to teach courses or parts of courses (this would provide opportunities for faculty and practitioners to interact).
- Consider the role of student internships and cooperative work/study programs in accounting programs.
- Counsel students on the types of career opportunities in accounting and the kinds of information they should be obtaining at recruiting interviews.
- Because students generally will not have the opportunity to read this Statement, provide them with the recommendations for students below.

Students

Students should seek opportunities to obtain first-hand knowledge of the business world and practice environment.

- Seek internships, cooperative work/study arrangements, and summer employment opportunities that are broadly relevant to your likely career choice[1].
- Students considering an accounting career should seek general business and organizational experience, not just accounting experience, because a key role of accounting is to support managerial decision making.
- Seek campus opportunities to build communication and business skills; for example, serve as an officer of a campus organization.

Students should obtain information about career opportunities and the job search.

- Become informed about career opportunities and the working conditions they provide. Since all professions have some entry-level experiences that are the counterpart of apprenticeship, compare conditions within professions in order to provide perspective.
- Perform a critical assessment of the relationship between your aptitudes, interests, skills, and knowledge and those required by various career opportunities.
- Student accounting organizations (for example, Beta Alpha Psi) should identify information that students should seek at recruiting interviews.

Career Planning and Placement Professionals

Career planning and placement professionals should organize career education programs.

- Expose students to the full range of accounting career options.
- Help establish internships and other short-term volunteer opportunities.

Career planning and placement professionals should advice and counsel students on career issues.

- Help students integrate their knowledge of accounting careers and their knowledge of themselves.
- Advise student accounting organization officers on appropriate speakers.
- Obtain industry information on working conditions and benefits (e.g., average compensation) and provide it to students.

Recruiters

Recruiters should acquire and maintain high levels of knowledge about educational and early employment issues.

- Keep abreast of curriculum and faculty changes at institutions that are recruiting sites and assess the degree to which these institutions are preparing students for your organization's work environment.

- Speak to recent hires in your organization before beginning the recruiting process to sensitize yourself to recent hires' concerns about working conditions and their careers.
- Know your organization's official position on educational and recruiting issues so that you avoid confusing students (and faculty) with inconsistent messages, for example, about the types of graduates sought.
- Know the social and economic value of the work for which you are recruiting (for example, the audit's role in capital formation and capital cost reduction) so that you will not communicate confusion or doubt on this subject to those entering the profession.

Recruiters should communicate accurately and fully about the early employment experience.

- In communicating to the placement office, faculty, and potential hires, be realistic about the job opportunities and work environment at your organization and the characteristics sought in new hires.
- Be aware that the attitudes you convey in the recruiting process can affect graduates' early employment experiences.
- Never withhold information necessary to a reasonable appreciation of facts presented.
- Arrange when feasible to have interchanges between potential recruits and younger members of your organization in circumstances permitting candor.

Supervisors of Early Work Experience

Supervisors should provide strong leadership and mentoring.

- Give frequent, honest, open and interactive feedback to recent hires under your supervision. Listen to new or recent hires for indirect messages about their employment experience; when dissatisfaction is expressed, inquire directly about its nature and causes.
- Work to improve counseling and mentoring,for example, by always acknowledging good performance, by treating employees under your supervision as individuals with careers (not just short-term tasks), by helping employees to understand their future opportunities, and by inquiring about their concerns and plans.
- Be a role model of a professional, conveying pride in your work and its importance to clients/customers and society.

Supervisors should build working conditions that are conductive to success.

- Inculcate a do-it-right-the-first-time mentality and create the conditions to help make it possible. For example, explain assignments thoroughly, allocate sufficient

time to do high quality work, be open about any necessary constraints (including budgetary constraints), explain how assignments fit in with the "big picture," and supervise work to completion.
- Analyze your own experience as a new or recent hire and treat new or recent hires as you would have liked to be treated.
- Maintain a "level playing field" for your subordinates, fairly distributing the opportunities and burdens. Minimize job-related stress (realizing that recent hires are especially subject to stress and that you may be the source of it!).
- Supervisors should provide challenging and stimulating work assignments.
- Delegate responsibility to recent recruits as soon as they are ready to assume it.
- Maximize your subordinates' opportunities to use verbal skills (both oral and written), critical thinking, and analytic techniques and help subordinates improve those skills.

Workplace Educators of First- Through Third-Year Employees

Workplace educators should select and design educational experience based on knowledge of employees' needs.

- Understand the demographics of those you are responsible to educate, including their prior education, experience, strengths, and deficiencies, and apply the knowledge in designing the curriculum.
- Identify gaps between new hires' expectations and the experience offered by the organization and design the curriculum to help close them.
- Work to ensure that employees are assigned to courses they need when they need them, including training-on-demand to the extent it is feasible.
- Understand the employees' evolving job requirements and the organization's changing business needs, and adapt the curriculum in response.

Early employment education should reinforce important skills.

- Design the curriculum to reinforce communication, interpersonal, and intellectual skills.
- Provide all employees who direct the work of others, not just those at the management level, with skills in personnel management.

Employer Management

Management should acquire and maintain knowledge of the early employment experience.

- Apply techniques to assess the early-employment experiences of professionals in your organization (for example, use alumni surveys, morale surveys, employee

focus groups, staff committees, and upward evaluation of superiors) and correct identified problems.

Management should promote working conditions that junior employees find attractive, nurturing, and stimulating.

- Match job content and skills, delegating work to the extent possible and assigning nonprofessional work to nonprofessionals.
- Consistently recognize outstanding performance.
- Implement programs that enhance mentoring opportunities (for example, big brother/sister programs).
- Install skill-based promotion and compensation systems (and avoid lockstep or time-in-grade systems).

Management should help fulfill the other recommendations in this Statement.

- Take responsibility for having your recruiters, supervisory personnel, and workplace educators follow the recommendations above.
- Create meaningful opportunities for interaction with faculty (e.g., internships).
- Create meaningful internship and/or work/study arrangements for interested students.
- Provide educational institutions with adequate information about your recruiting needs and the nature of your business and ensure that your own recruiters have such information.
- Communicate pride in the profession and the importance of its work.

The AECC acknowledges the contributions to the Statement of the following task force members who are not Commission members: James W. Deitrick, Brian J. Jemelian, and Jean C. Wyer.

Other Statements issued by the Accounting Education Change Commission:

Issues Statement No. 1: *AECC Urges Priority for Teaching in Higher Education* (August 1990).

Position Statement No. One: *Objectives of Education for Accountants* (September 1990).

Issues Statement No. 2: *AECC Urges Decoupling of Academic Studies and Professional Accounting Examination Preparation* (July 1991).

Position Statement No. Two: *The First Course in Accounting* (June 1992).

Issues Statement No. 3: *The Importance of Two-Year Colleges for Accounting Education* (August 1992).

Issues Statement No. 5: *Evaluating and Rewarding Effective Teaching* (April 1993).

[1]The opportunities cited here include unpaid positions that instill relevant business or organizational knowledge.

APPENDIX B. DATA COLLECTION INSTRUMENTS FOR CONTROL GROUP

Table B1. Participant Demographics Information Survey

Participant Demographics Information
This survey is intended to gather information about the demographic of students in this course. The data will be used to provide a picture of the learners, as a group, in this course. The data will additionally be used as information as part of the study this instructor is conducting in this course (see Informed Consent). This is an anonymous survey. Please do not place your name anywhere on this survey. Thank you in advance for completing this survey.

Place an X in the box below the description that best fits you.

	Male	Female				
Gender						
	Caucasian (White)	**African American**	**Latino**	**Asian**	**Other**	
Ethnicity						
	High School Student	**17-22 Not a High School Student**	**23-29**	**30-35**	**36+**	
Age						
	Accounting	**General Business/Marketing/Management**	**Social Sciences - Psychology, Sociology, etc.**	**Science - Biology, Chemistry, etc.**	**Arts - Communication, Art, etc.**	**Not Sure/Have Not Chosen A Program/ Other - please describe**
Program of Study						
	None	**High School Class**	**College Course**	**Work Experience**	**Personal Experience**	**Other - please describe**
Previous Accounting Experience						

Table B1. Participant Demographics Information Survey Continued

	No Concern - I will do fine	Some Concern - but I think I will be okay	It will be fine	Concerned - I don't think I will do as well as I would like	Extremely Concerned - I am not likely to pass this course	
Concern about ability to be successful in this course						
	I Know What Accounting is About	**I am Fairly Comfortable I Know What Accounting is About**	**I Have A General Idea What Accounting Is About**	**I Might Know A Little About What Accounting Is About**	**I Have No Clue What Accounting Is About**	
Understanding of what of accounting is all about						

Additional Comments:

Table B2. Participant Exam Feedback – Individual Exam

Chapter Exam #:
_____ ACC 211-Fall Online One, Individual Exam

Participant Exam Feedback Please provide feedback to your instructor about this exam. Note: for chapter exams number 2 & 3 consider how your feelings might have changed since the last exam.

Place an X in the box below the description that best fits you.

How do you feel you did on this exam.	**Terrible**	**Poor**	**Okay**	**Good**	**Excellent**	
What do you think you will get on this exam?	**A** **93-100**	**A-** **90-29**	**B+** **87-89**	**B** **83-86**	**B-** **80-82**	**C +** **77-79**
	C **73-76**	**C-** **70-72**	**D+** **67-69**	**D** **60-66**	**F** **0-59**	
Approximately how many hours did you spend studying for this exam?	**Not at all**	**Less than 2 hours**	**2-3 Hours**	**3-4 Hours**	**4-5 Hours**	**5+ Hours**
What assistance did you receive in preparing for this exam? Check all that apply.	**None**	**Tutoring Center**	**Instructor Face-to-Face**	**Instructor Online**	**Study Group/Discussion Board**	**Other - please describe**
What, do you think, would have helped you to be more successful on this exam?	**Notes**	**Books**	**Computer**	**Being able to work with other learners**	**Working with the instructor**	**None/Other - please describe in the additional comments section below**
Have you been able to take exams before with any of these items? Check all that apply.	**Notes**	**Books**	**Computer**	**Being able to work with other learners**	**Working with the instructor**	**None/Other - please describe in the additional comments section below**

Table B2. Participant Exam Feedback Continued– Individual Exam

Why do you think the items in the last two questions made you feel better about the exam? Check all that apply.	**I was able to learn the material better**	**I was as anxious or stressed about the exam**	**It made the exam a better experience**	**I felt like I was active in the classroom**	**I was able to discuss and listen so that I understood how to apply the material better**	**None/Other - please describe in additional comments below**
What are the benefits of taking an exam individually? Check all that apply.	**I really study for the exam**	**I believe I really learn the material**	**I am not distracted by others ideas or conversations**	**The instructor know I know the material by evidence of my grade**	**There are no benefits**	**Other - please describe in additional comments below**
Select your most preferred method for taking an exam.	**Individual - no books, no notes**	**Individual - with books and notes**	**In a group - no books, no notes**	**In a group - with books and notes**	**Individually Online**	**Group Online**

Additional Comments:

APPENDIX C – DATA COLLECTION INSTRUMENTS FOR TREATMENT GROUP

Table C1. Participant Demographics Information Survey

Participant Demographics Information

This survey is intended to gather information about the demographic of students in this course. The data will be used to provide a picture of the learners, as a group, in this course. The data will additionally be used as information as part of the study this instructor is conducting in this course (see Informed Consent). This is an anonymous survey. Please do not place your name anywhere on this survey. Thank you in advance for completing this survey.

Place an X in the box below the description that best fits you.

	Male	Female				
Gender						
	Caucasian (White)	**African American**	**Latino**	**Asian**	**Other**	
Ethnicity						
	High School Student	**17-22 Not a High School Student**	**23-29**	**30-35**	**36+**	
Age						
	Accounting	**General Business/Marketing/Management**	**Social Sciences - Psychology, Sociology, etc.**	**Science - Biology, Chemistry, etc.**	**Arts - Communication, Art, etc.**	**Not Sure/Have Not Chosen A Program/ Other - please describe**
Program of Study						

Table C2. Participant Exam Feedback - Collaborative Exam

Chapter Exam #: _____

ACC 211-Fall Online Two, Collaborative Exam

Participant Exam Feedback

Please provide feedback to your instructor about this exam. Please complete this survey individually, without discussion among peers. The focus is how you feel about this exam individually. Note: for chapter exams number 2, 3, and 4 consider how your feelings might have changed since the last exam.

Place an X in the box below the description that best fits you.

How do you feel you did on this exam.	**Terrible**	**Poor**	**Okay**	**Good**	**Excellent**	
What do you think you will get on this exam?	**A 93-100**	**A- 90-29**	**B+ 87-89**	**B 83-86**	**B- 80-82**	**C + 77-79**
	C 73-76	**C- 70-72**	**D+ 67-69**	**D 60-66**	**F 0-59**	
Approximately how many hours did you spend studying for this exam?	**Not at all**	**Less than 2 hours**	**2-3 Hours**	**3-4 Hours**	**4-5 Hours**	**5+ Hours**
What assistance did you receive in preparing for this exam? Check all that apply.	**None**	**Tutoring Center**	**Instructor Face-to-Face**	**Instructor Online**	**Study Group/Discussion Board**	**Other - please describe**
Consider the collaborative aspect of this exam. How do you feel this impacted your success on the exam?	**Not At All - I would have been fine on my own**	**A Little - There were minor things that I needed to talk through and it may have added to my understanding**	**It helped - I didn't really mind the discussion but I would have also been fine on my own**	**A lot - This type of exam helped me to better understand the material**	**Completely - I feel I really understand the material and have learned how to apply it**	

Table C2. Participant Exam Feedback Continued - Collaborative Exam

Consider the differences in taking an exam individually versus collaboratively. What is your preference for taking a ***collaborative*** exam?	**Do Not Prefer - I like to take my exam individually**	**Its Fine - if that is what is required for the class**	**Either Way Is Fine - I really have no preference**	**It Is Good - I tend to prefer this method**	**Completely Prefer - I wish I could take all of my exams this way**	
What are your concerns about taking a collaborative exam? Check all that apply.	**Others won't come prepared.**	**I will have to do all of the work.**	**I won't come prepared.**	**It feels like I am cheating.**	**I will be assigned a group grade.**	**Other - please describe in additional comments below**
What do you like about collaborative exams?	**I learn and understand the material better**	**I don't want to let the group down so I prepare more**	**I enjoy working with others to solve problems**	**I feel like I am actively engaged in the class**	**I feel like I develop a network of peers to work with in the future**	**Other - please describe in additional comments below**
What are your group preferences for a collaborative exam? Check all that apply.	**Learners select their groups**	**Instructor selects groups randomly.**	**Instructor selects groups based on ability**	**Groups are randomly selected**	**Groups change each exam**	**Groups remain the same all semester**
What are your preferences regarding groups size for a collaborative exam?	**2 people**	**3 people**	**4 people**	**5 people**		

Additional Comments:

Table C3. Professional Skills Group Feedback

Professional Skills Group Feedback

Please use this form, as a group to evaluate the group's practice of professional skills. This form should be completed for the group, come to a group consensus. Only one form per group will be turned in. Focus on whether you think the group PRACTICED these skills, not on if the group has these skills or how good you think the group is at them. This skill set is adapted from the American Accounting Association's Composite Profile of Capabilities Needed by Accounting Graduates[1].

Student Name (Optional): _____ Group #: _____

Professional Skill	5	4	3	2	1	
General Knowledge	**Practiced Entire Exam**	**Practiced A lot**	**Practiced Some**	**Practiced Very Little**	**Did Not Practice**	**Comments**
Understanding of general history and cultural perspective						
Use/Understanding of basics in other subjects, for example, Math, Science, Economics						
Understanding of political, social, and economic issues						
Understanding/evaluation of personal values, morals, ethics, and/or beliefs						
Appreciation of art, literature, and/or science						
Intellectual	**Practiced Entire Exam**	**Practiced A lot**	**Practiced Some**	**Practiced Very Little**	**Did Not Practice**	**Comments**
Ability to reason, inquire, and/or critically analyze						
Ability to identify problem, problem-solve, and/or help in problem-solving						
Ability to identify ethical issues and identify possible consequences of choices						
Ability to identify appropriate alternative to solve problems and analyze their consequences						
Ability to meet stressful deadlines in a efficient and effective manner						

Table C3. Professional Skills Group Feedback Continued

Interpersonal Skills	**Practiced Entire Exam**	**Practiced A lot**	**Practiced Some**	**Practiced Very Little**	**Did Not Practice**	**Comments**
Ability to work in a group to lead and motivate						
Ability to work in a group to discuss, argue, negotiate, and problem-solve						
Ability to work in a group to delegate and organize						
Ability to work in group to withstand and resolve conflict						
Ability to work in a group that is culturally and intellectually diverse						
Communication	**Practiced Entire Exam**	**Practiced A lot**	**Practiced Some**	**Practiced Very Little**	**Did Not Practice**	**Comments**
Ability to present, discuss, and defend views						
Ability to listen effectively						
Organizational and Business Knowledge	**Practiced Entire Exam**	**Practiced A lot**	**Practiced Some**	**Practiced Very Little**	**Did Not Practice**	**Comments**
Understanding of general business and accounting workplace practices						
Understanding of basic of finance, including analysis and markets						
Understanding of business workplace group dynamics						
Understanding of change and growth within an environment						
Accounting Knowledge	**Practiced Entire Exam**	**Practiced A lot**	**Practiced Some**	**Practiced Very Little**	**Did Not Practice**	**Comments**
History of accounting profession and general accounting profession thought						
Policy, environmental, and regulation issues						

Table C3. Professional Skills Group Feedback Continued

Basic accounting concepts, reporting issues and understanding needs of users of information,						
Taxation and its impact on the entity						
Ability to apply accounting knowledge to real world problems						
Personal Capacities and Attitudes	**Practiced Entire Exam**	**Practiced A lot**	**Practiced Some**	**Practiced Very Little**	**Did Not Practic e**	**Comments**
Creative Thinking						
Integrity						
Energy						
Motivation						
Persistence						
Empathy						
Leadership						
Sensitivity to Social Responsibilities						
Commitment to Life-long Learning						

Additional Comments:

APPENDIX D – DATA COLLECTION INSTRUMENTS FOR INSTRUCTOR/RESEARCHER

Professional Skills Instructor Observations

Professional Skills Instructor Observation
This form will be used for instructor observation of groups during collaborative exams. This skill set is adapted from the American Accounting Association's Composite Profile of Capabilities Needed by Accounting Graduates [1].

Professional Skill	5	4	3	2	1	
General Knowledge	**Practiced Entire Exam**	**Practiced A lot**	**Practiced Some**	**Practiced Very Little**	**Did Not Practice**	**Comments**
Understanding of general history and cultural perspective						
Use/Understanding of basics in other subjects, for example, Math, Science, Economics						
Understanding of political, social, and economic issues						
Understanding/evaluation of personal values, morals, ethics, and/or beliefs						
Appreciation of art, literature, and/or science						
Intellectual	**Practiced Entire Exam**	**Practiced A lot**	**Practiced Some**	**Practiced Very Little**	**Did Not Practice**	**Comments**
Ability to reason, inquire, and/or critically analyze						
Ability to identify problem, problem-solve, and/or help in problem-solving						
Ability to identify ethical issues and identify possible consequences of choices						
Ability to identify appropriate alternative to solve problems and analyze their consequences						
Ability to meet stressful deadlines in a efficient and effective manner						

Professional Skills Instructor Observations Continued

Interpersonal Skills	**Practiced Entire Exam**	**Practiced A lot**	**Practiced Some**	**Practiced Very Little**	**Did Not Practice**	**Comments**
Ability to work in a group to lead and motivate						
Ability to work in a group to discuss, argue, negotiate, and problem-solve						
Ability to work in a group to delegate and organize						
Ability to work in group to withstand and resolve conflict						
Ability to work in a group that is culturally and intellectually diverse						
Communication	**Practiced Entire Exam**	**Practiced A lot**	**Practiced Some**	**Practiced Very Little**	**Did Not Practice**	**Comments**
Ability to present, discuss, and defend views						
Ability to listen effectively						
Organizational and Business Knowledge	**Practiced Entire Exam**	**Practiced A lot**	**Practiced Some**	**Practiced Very Little**	**Did Not Practice**	**Comments**
Understanding of general business and accounting workplace practices						
Understanding of basic of finance, including analysis and markets						
Understanding of business workplace group dynamics						
Understanding of change and growth within an environment						
Accounting Knowledge	**Practiced Entire Exam**	**Practiced A lot**	**Practiced Some**	**Practiced Very Little**	**Did Not Practice**	**Comments**
History of accounting profession and general accounting profession thought						

Professional Skills Instructor Observations Continued

Policy, environmental, and regulation issues						
Basic accounting concepts, reporting issues and understanding needs of users of information,						
Taxation and its impact on the entity						
Ability to apply accounting knowledge to real world problems						
Personal Capacities and Attitudes	**Practiced Entire Exam**	**Practiced A lot**	**Practiced Some**	**Practiced Very Little**	**Did Not Practic e**	**Comments**
Creative Thinking						
Integrity						
Energy						
Motivation						
Persistence						
Empathy						
Leadership						
Sensitivity to Social Responsibilities						
Commitment to Life-long Learning						

Additional Comments:

APPENDIX E – DETAILED DATA OF STUDENT AND INSTRUCTOR COMMENTS

Table E1. Professional Skills Feedback Form – Treatment Group

Professional Skill	Exam I (n=8) /Exam II (n=5) /Exam III (n=4)					
General Knowledge	Practiced Entire Exam	Practiced Alot	Practiced Some	Practiced Very Little	Did Not Practice	Comments
Understanding of general history and cultural perspective	x/x/x	1/x/x	2/2/3	x/1/x	5/2/1	What?
Use/Understanding of basics in other subjects, for example, Math, Science, Economics	1/1/x	1/2/3	5/2/x	1/x/1	x/x/x	
Understanding of political, social, and economic issues	1/x/x	x/x/x/	2/2/2/	1/x/x/	4/3/2	
Understanding/evaluation of personal values, morals, ethics, and/or beliefs	4/x/1	1/1/1	x/2/1	x/x/x	3/2/1	
Appreciation of art, literature, and/or science	1/x/x	x/x/x/	2/1/2	x/1/1	5/3/1	
Intellectual	Practiced Entire Exam	Practiced Alot	Practiced Some	Practiced Very Little	Did Not Practice	Comments
Ability to reason, inquire, and/or critically analyze	3/4/2	5/x/2	x/1/x	x/x/x	x/x/x	
Ability to identify problem, problem-solve, and/or help in problem-solving	3/3/2	4/1/2	1/x/x	x/1/x	x/x/x	
Ability to identify ethical issues and identify possible consequences of choices	1/2/1	2/x/1	3/1/2	1/1/x	1/1/x	
Ability to identify appropriate alternative to solve problems and analyze their consequences	3/3/1	2/1/1	2/x/2	x/1/x	1/x/x	
Ability to meet stressful deadlines in a efficient and effective manner	1/3/1	3/1/1	4/x/2	x/1/x	x/x/x	
Interpersonal Skills	Practiced Entire Exam	Practiced Alot	Practiced Some	Practiced Very Little	Did Not Practice	Comments
Ability to work in a group to lead and motivate	4/4/1	4/x/3	x/1/x	x/x/x	x/x/x	
Ability to work in a group to discuss, argue, negotiate, and problem-solve	5/4/1	3/x/3	x/1/x	x/x/x	x/x/x	

Table E1. Professional Skills Feedback Form Continued – Treatment Group

Ability to work in a group to delegate and organize	3/4/1	2/x/2	1/1/1	1/x/x	1/x/x	
Ability to work in group to withstand and resolve conflict	3/4/1	3/x/3	x/1/x	1/x/x	1/x/x	
Ability to work in a group that is culturally and intellectually diverse	3/2/x	2/x/2	2/1/x	x/x/1	1/2/1	
Communication	Practiced Entire Exam	Practiced Alot	Practiced Some	Practiced Very Little	Did Not Practice	Comments
Ability to present, discuss, and defend views	3/3/1	3/1/2	1/1/1	x/x/x	1/x/x	
Ability to listen effectively	4/3/1	4/1/3	x/1/x	x/x/x	x/x/x	
Organizational and Business Knowledge	Practiced Entire Exam	Practiced Alot	Practiced Some	Practiced Very Little	Did Not Practice	Comments
Understanding of general business and accounting workplace practices	1/3/1	5/1/3	2/1/x	x/x/x	x/x/x	
Understanding of basic of finance, including analysis and markets	1/1/x	2/x/3	4/4/x	x/x/1	1/x/x	
Understanding of business workplace group dynamics	3/1/x	1/1/2	4/2/2	x/1/x	x/x/x	
Understanding of change and growth within an environment	2/x/x	x/1/2	4/1/1	x/1/1	2/2/x	
Accounting Knowledge	Practiced Entire Exam	Practiced Alot	Practiced Some	Practiced Very Little	Did Not Practice	Comments
History of accounting profession and general accounting profession thought	1/1/x	1/1/2	3/3/2	3/x/x	x/x/x	
Policy, environmental, and regulation issues	1/x/x	x/1/x	3/2/2	x/1/1	4/1/1	
Basic accounting concepts, reporting issues and understanding needs of users of information,	2/2/1	3/1/1	3/2/2	x/x/x	x/x/x	
Taxation and its impact on the entity	x/x/x	1/x/1	1/2/2	1/3/6	5/x/1	
Ability to apply accounting knowledge to real world problems	3/2/1	2/1/x	1/2/3	1/x/x	1/x/x	

Table E1. Professional Skills Feedback Form Continued – Treatment Group

Personal Capacities and Attitudes	Practiced Entire Exam	Practiced Alot	Practiced Some	Practiced Very Little	Did Not Practice	Comments
Creative Thinking	1/2/1	3/2/1	1/1/2	1/x/x	2/x/x	
Integrity	4/2/x	2/1/x	1/1/3	x/x/1	1/1/x	
Energy	4/3/1	3/1/1	1/1/1	x/x/x	x/x/1	
Motivation	5/4/1	3/x/3	x/1/x	x/x/x	x/x/x	
Persistence	6/4/1	2/x/1	x/1/2	x/x/x	x/x/x	
Empathy	2/1/x	4/1/2	1/2/1	x/x/1	1/1/x	
Leadership	4/3/1	3/x/2	1/2/1	x/x/x	x/x/x	
Sensitivity to Social Responsibilities	2/1/x	3/x/3	2/3/x	x/x/x	1/1/1	
Commitment to Life-long Learning	3/2/x	3/x/2	x/2/2	x/x/x	2/1/x	

Additional Comments:
No additional comments were given for any of the exams.

Table E2. Professional Skills Instructor Observations

Professional Skill	
General Knowledge	
Understanding of general history and cultural perspective	Practiced Very Little *Comment: First exam included 2 multiple choice questions regarding the conceptual framework which could be considered historical.*
Use/Understanding of basics in other subjects, for example, Math, Science, Economics	Practiced A lot *Comment: Basic Math for all exams*
Understanding of political, social, and economic issues	Practiced Some *Comment: At times, students would make comments relating the material to their personal situations.*
Understanding/evaluation of personal values, morals, ethics, and/or beliefs	Practiced A lot *Comment: Exams, in general did not include ethics/values questions, however students were observed on a few questions commenting on following the instructions of the exam, for example working through the exam together and not moving ahead individually.*
Appreciation of art, literature, and/or science	Did Not Practice
Intellectual	
Ability to reason, inquire, and/or critically analyze	Practiced A lot
Ability to identify problem, problem-solve, and/or help in problem-solving	Practiced A lot
Ability to identify ethical issues and identify possible consequences of choices	Practiced Some
Ability to identify appropriate alternative to solve problems and analyze their consequences	Practiced Some
Ability to meet stressful deadlines in a efficient and effective manner	Practiced Some
Interpersonal Skills	
Ability to work in a group to lead and motivate	Practiced Entire Exam
Ability to work in a group to discuss, argue, negotiate, and problem-solve	Practiced Entire Exam
Ability to work in a group to delegate and organize	Practiced Entire Exam
Ability to work in group to withstand and resolve conflict	Practiced Entire Exam
Ability to work in a group that is culturally and intellectually diverse	Practiced Entire Exam
Communication	
Ability to present, discuss, and defend views	Practiced Some *Comment: Not all students practice this skill. On many occasions students were observed to simply follow along and were heard saying things like "I don't really know it sounds good and I just want to get done."*

Table E2. Professional Skills Instructor Observations Continued

Ability to listen effectively	Practiced A lot
Organizational and Business Knowledge	
Understanding of general business and accounting workplace practices	Practiced Some
Understanding of basic of finance, including analysis and markets	Practiced Very Little
Understanding of business workplace group dynamics	Practiced Some
Understanding of change and growth within an environment	Practiced Very Little
Accounting Knowledge	
History of accounting profession and general accounting profession thought	Did Not Practice
Policy, environmental, and regulation issues	Did Not Practice
Basic accounting concepts, reporting issues and understanding needs of users of information,	Practiced Entire Exam
Taxation and its impact on the entity	Practiced Very Little
Ability to apply accounting knowledge to real world problems	Practiced A lot
Personal Capacities and Attitudes	
Creative Thinking	Practiced A Lot
Integrity	Practiced Entire Exam
Energy	Practiced Entire Exam
Motivation	Practiced Entire Exam
Persistence	Practiced Entire Exam
Empathy	Practiced Some
Leadership	Practiced Some
Sensitivity to Social Responsibilities	Practiced Very Little
Commitment to Life-long Learning	Practiced Very Little

Additional Comments and Observations during Exams, these observations were made by instructor, who was also the researcher:

Exam I: It took a large effort for groups to schedule their exams with the instructor. Two groups waited until the day before they wanted to test to schedule their exam.

Two groups noted that they studied together before taking the exam.

All groups received some coaching on how the process worked, no student indicated that they had taken a collaborative exam before.

Three students failed to show up on time for their exam, all three were more than 15 minutes late. One student failed to show up at all and had to be placed into the last group testing for the week. This left one group to test with two people.

Additional Comments and Observations during Exams Continued

Students were given the option of starting over for late members or to leave the late member to complete the items missed on their own. All three groups chose to start over with one person commenting that they "would learn the material better that way."

One male student made it clear he did not like the fact that he had to come to campus to test and absolutely did not want to be bothered with a "group exam." He was observed to be much less resistant to the method within about 20 minutes into working with the group. Although, he was also reminded several times throughout the exam that the instructions were to work through the exam as a group and not move ahead individually.

One male student said he would not have passed the exam if he had taken it alone and felt like he learned some concepts that he had been missing and it "made sense" to him now.

In general, students followed the spirit of the collaborative exam, with six students specifically saying they enjoyed it and was glad they could take their exams this way.

Students were observed to work well together by accommodating for slower members. All groups were observed to take the time to explain concepts that others were missing or not clear on.

Comments were made in each group, throughout the exam that were encouraging to all members. Members were observed to have a sense of humor regarding their own mistakes or the about the difficulty level of the subject of accounting and/or the exam.

Students were aware of the time constraints and encouraged each other to move on when they were stuck and make notations of what they had done on the problem for when they returned to it.

When the each group came to the last problem, which was 100 of the 200 points on the exam and was comprehensive, they all seemed overwhelmed. One or two members would encourage the group to "just get started" and made motivating comments to continue through to the end – "even if it didn't balance."

Two groups asked if they could keep the same group for the next exam and it was explained that they groups would be assigned randomly.

Exam II: Again, there was some difficulty and prodding that needed to take place to get students to schedule a testing time.

Again, three students failed to show up on time and one student called and said she was sick, ten minutes into her testing time. She was rescheduled for another group.

Again, all three groups chose to start over for late members and were accommodating of members who were re-assigned groups.

One group mentioned that they had tried to get together to study but could not find a good time.

Groups started working quicker this time and seemed to feel more comfortable with the process.

Several students commented that they did not study like they wanted to and made apologetic comments to the other group members and hoped they didn't "bring the group down."

All groups discussed difficult concepts and worked together to solve the exam together.

It was observed that on short answer or multiple-choice questions the students would work them individually and then compare answers, discussing any differences. Two groups asked if this was okay as they were trying to be mindful of the instructions for taking the exams. They were assured this was an appropriate method to use.

All but one group completed the exam with 45 minutes extra, the one group used the full amount of time.

After this exam, students left seeming to feel more confident that they had done well on the exam.

Exam III: The process of scheduling the exam went much smoother for this exam.

One student attempted to bow out at the last minute but was warned she would take a zero on the exam and made scheduled exam time.

Students seemed much more relaxed with each other this time. Three groups tested at the same time and wanted to know if they could all test together. They were asked not to combine the groups but told they could confer with another group if they had been working on a problem for a while and need a push in the right direction.

Again, students were observed discussing, even arguing this exam, and consulting each other for help.

Groups were observed patiently discussing differences, with the exception of one group where discussion seemed to get a little heated, they were encouraged by the instructor to "play nice" which seemed to bring the tension down and they got back to work.

It appeared that most students enjoying the process of learning in this manner.

One male student made it clear he was not going to work with the group. Although he sat at the table he proceeded to complete his exam primarily individually even when reminded that the exam was to be worked together.

Students were working a little more slowly on this exam and had to be aware of the time constraints.

Also, students made comments that led the instructor to assume little studying had been done before this exam.

Four students made comments that they appreciated this method of taking tests but wanted to pick their own groups or work in a group with "more responsible" classmates.

Professional Skills Instructor Observation Continued

General Knowledge	Practiced Entire Exam	Practiced A lot	Practiced Some	Practiced Very Little	Did Not Practice	Comments
Understanding of general history and cultural perspective						
Use/Understanding of basics in other subjects, for example, Math, Science, Economics						
Understanding of political, social, and economic issues						
Understanding/evaluation of personal values, morals, ethics, and/or beliefs						
Appreciation of art, literature, and/or science						
Intellectual	Practiced Entire Exam	Practiced A lot	Practiced Some	Practiced Very Little	Did Not Practice	Comments
Ability to reason, inquire, and/or critically analyze						
Ability to identify problem, problem-solve, and/or help in problem-solving						
Ability to identify ethical issues and identify possible consequences of choices						
Ability to identify appropriate alternative to solve problems and analyze their consequences						
Ability to meet stressful deadlines in a efficient and effective manner						
Interpersonal Skills	Practiced Entire Exam	Practiced Alot	Practiced Some	Practiced Very Little	Did Not Practice	Comments
Ability to work in a group to lead and motivate						
Ability to work in a group to discuss, argue, negotiate, and problem-solve						
Ability to work in a group to delegate and organize						
Ability to work in group to withstand and resolve conflict						
Ability to work in a group that is culturally and intellectually diverse						

Communication	Practiced Entire Exam	Practiced A lot	Practiced Some	Practiced Very Little	Did Not Practice	Comments
Ability to present, discuss, and defend views						
Ability to listen effectively						
Organizational and Business Knowledge	Practiced Entire Exam	Practiced A lot	Practiced Some	Practiced Very Little	Did Not Practice	Comments
Understanding of general business and accounting workplace practices						
Understanding of basic of finance, including analysis and markets						
Understanding of business workplace group dynamics						
Understanding of change and growth within an environment						
Accounting Knowledge	Practiced Entire Exam	Practiced A lot	Practiced Some	Practiced Very Little	Did Not Practice	Comments
History of accounting profession and general accounting profession thought						
Policy, environmental, and regulation issues						
Basic accounting concepts, reporting issues and understanding needs of users of information,						
Taxation and its impact on the entity						
Ability to apply accounting knowledge to real world problems						
Personal Capacities and Attitudes	Practiced Entire Exam	Practiced A lot	Practiced Some	Practiced Very Little	Did Not Practice	Comments
Creative Thinking						
Integrity						
Energy						
Motivation						
Persistence						
Empathy						
Leadership						
Sensitivity to Social Responsibilities						
Commitment to Life-long Learning						

Additional Comments: