IMPLEMENTING COOPERATIVE LEARNING
AND CONCEPT MAPPING:
THEIR IMPACT ON STUDENT LEARNING AND ATTITUDES
IN INTERMEDIATE ACCOUNTING

By

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Abstract

This study explores the effect of implementing expert-developed concept maps and cooperative learning, as compared to direct instruction and cooperative learning, on student learning, experiences and perceptions.

Using a mixed-methods research design, data was collected to determine the impact of these combined instructional strategies on students learning as measured by examination scores. Surveys were used to gather data on students' thoughts and feelings towards group work and concept mapping. Finally, a pre- and post-survey was used to determine if instructional strategies impacted students' perceptions of accounting.

The results of the study show a significant difference in students learning as measured by examination scores between the treatment and control group. The majority of students reported a preference for group work as well as expert-developed concept maps. Overall students' perceptions of accounting declined in both the treatment and control group.
Acknowledgements

First, I would like to thank the intermediate accounting students who participated in this study. Their willingness to be a part of my research, where we were able to learn and discover together, was humbling. My students are the reason I am an educator and their contribution to my research will, I hope, be repaid through my striving to continually improve the teaching and learning of accounting in higher education. It is my students who continually inspire me to be the best that I can be.

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CHAPTER 1 - INTRODUCTION

The purpose of this study is to explore a new method of teaching intermediate accounting to students at a Canadian university. The focus of the study will be the comparison of the combined use of Concept Maps and Cooperative Learning to Direct Instruction and Cooperative Learning. A key aspect of this research is the impact on both student learning, as measured by examination scores, and student perceptions of accounting, as measured by a survey. In addition, I will examine the student experience with regards to Cooperative Learning and Concept Maps. Although multiple studies have shown the benefits of implementing these two instructional strategies separately this study is directed towards the impact of implementing both strategies simultaneously, an area that has not been well researched in accounting education.

Intermediate accounting (Intermediate Accounting I) is a required course for students who choose to major in either accounting or finance. A number of factors make the study of intermediate accounting challenging for students: the volume of material covered, the level of complexity, and students’ perceptions of accounting.

Typical intermediate accounting textbooks often exceed 800 pages (Beechy, Conrod, & Farrell, 2011; Kieso et al., 2013). They include both accounting principles for entities using International Financial Reporting Standards (IFRS) as well as those using Accounting Standards for Private Entities (ASPE). This dual coverage increases content density as well as complexity. Many of the chapters have between eight and fifteen learning objectives (Kieso et al., 2013) covering concepts necessary for the continued study of accounting. The resulting volume of material in a standard twelve week course
is high (Catanach, Croll & Grinaker, 2000). When students are enrolled in five third- or fourth-year university courses many find the total quantity of material overwhelming.

Accounting and finance majors are required to take introductory accounting in the first semester of university. This course is geared towards students who have never previously studied accounting and is therefore at a low level of complexity. Introductory accounting textbooks focus on IFRS and, as a result, students are not introduced to ASPE until their intermediate accounting course. In addition, intermediate accounting textbooks often assume that students have a standard level of prior knowledge but not all introductory accounting textbooks cover the same content at a similar level of depth. The gap between the simplicity of introductory accounting and the complexity of intermediate accounting can therefore be significant.

Research shows that many students enter accounting courses with negative attitudes towards accounting (Mladenovic, 2000). Ferreira and Santoso (2008) found that the academic performance of students who began managerial accounting with negative perceptions was worse than for those who entered with positive perceptions. Positive perceptions of accounting at the end of the course positively impact performance, although to a lesser degree. Unfortunately, they found that students’ positive perceptions deteriorated over the duration of the course. Similarly, Geiger and Ogilby (2000) found that both accounting majors and non-majors had "less favorable perceptions of the introductory course at the end of the semester as compared to the beginning of the semester" (p. 71). Novak (2010) notes that feelings "can enhance or impair learning" (p. 30) and that "[m]eaning making involves thinking, feeling and acting, and all three of these aspects must be integrated for significant new learning, and especially in new
knowledge creation” (p. 13). If students leave introductory accounting with negative perceptions then they are entering intermediate accounting with negatives perceptions. As demonstrated by Ferreira and Santoso’s (2008) research, negative attitudes have a harmful effect on student performance in accounting.

Given the challenges faced by intermediate accounting students, it is not surprising that intermediate accounting courses suffer from high dropout rates (Kilpatrick, Savage & Wilburn, 2013; Shoulders & Hicks, 2008; Waples, Darayseh, 2005) as well as high failure rates (Burnett, Xu, & Kennedy, 2010). Sanders and Willis (2009) note that "[f]or the Spring 2006 semester, 47.5 percent of the students enrolled in Intermediate I did not successfully complete the course" (p. 320). Failure rates within my own Intermediate Accounting I course range from 20% (Fall 2009) to 36% (Winter 2010). With the addition of attrition rates the percentage increases to greater than 50% in both semesters. Although multiple instructors teach this course, the attrition/failure rates across all instructors has been greater than 40% since Fall 2009, when I first began to investigate student outcomes in Intermediate Accounting I courses.

The challenges faced by intermediate accounting students may be exacerbated by the instructional methods used. Universities continued to use Direct Instruction (lectures) as the dominant mode of content delivery even though its pedagogical value is questionable. Jernstedt and Chow (1980) found no statistical difference in performance measures of students who attended lectures and those who either read a transcript of the lecture or a written text based on the lecture. Gow, Kember, and Cooper (1994) note that lectures provide minimal engagement and treat students as passive learners. The value of lectures in relation to learning may be further impacted by the use of PowerPoint
presentations. Although utilizing PowerPoint increases the organization and flow of lectures, Novak (2010) notes that "PowerPoint presentations tend to over emphasize a linear structure of knowledge to the exclusion of alternative perspectives" (p. 140). Students often prefer PowerPoint as an aid to memorization (Kinchin & Cabot, 2007) but a study by Sugahara and Boland (2006) found that PowerPoint usage by students was inversely related to student's performance.

Hay, Kinchin, and Lygo-Baker (2008) note that memorization, common in higher education, is non-learning. Novak (2010) notes that "meaningful learning is difficult, usually time consuming and tiring...we may escape the challenge by resorting to rote learning, even though we know that what we learn will soon be forgotten and it will not be of value in future learning" (as cited in Leauby, Szabat, & Maas, 2010, p. 284).

As an instructor of intermediate accounting, I used lectures supported by PowerPoint to teach intermediate accounting. After three semesters of high attrition/failure rates, I began to explore alternative teaching strategies to address the challenges faced by my students. Cooperative Learning (Bennett, Rolheiser, & Stevahn, 1991; Johnson, Johnson, & Smith, 2006; Slavin, 1995) is a small group instructional strategy where students work together to accomplish shared goals, maximizing both their own learning and that of other group members. The value of Cooperative Learning is that "learning is socially constructed; we seldom learn isolated from others" (Bennett & Rolheiser, 2001, p. 141). Novak and Gowin (1984) note that "[l]earning the meaning of a piece of knowledge requires dialog, exchange, sharing, and sometimes compromise" (p. 20).
Research has shown that students who are in cooperative groups have more positive intergroup relationships, greater academic growth, and are better satisfied with their education (Slavin, 1995). Cooperative Learning has been extensively researched at all levels of education and areas of study (Johnson et al., 2006; Slavin, 1995); however, instructors must be experienced at managing cooperative classrooms for Cooperative Learning to be effective. Bennett and Rolheiser (2001) note that "group work that is not structured thoughtfully is one of the least effective approaches to the teaching and learning process" (p. 141). They also note that "[i]t takes thoughtful work over time in order to achieve results" (p. 143). Clearly, Cooperative Learning must be implemented with care.

A Concept Map is a complex graphic organizer which is hierarchical in nature, with key concepts placed at the top followed by less complex concepts below (Novak & Gowin, 1984). Lines link the concepts and a word or phrase explains the relationship between the two. "The key purpose of Concept Maps is to organize student thinking by having student indicate the relationship between concepts hierarchically" (Bennett, 2010, p. 335). The benefit of Concept Maps is that it allows students to engage in meaningful learning as they continually refine their knowledge structures: new knowledge is connected to prior knowledge so that the knowledge structure becomes more complex but also more useful for future learning. In addition, Concept Maps can be used by instructors to communicate new concepts (Novak, 2010). Similar to Cooperative Learning, Concept Maps have been extensively researched at all levels of education and for many disciplines (Nesbit & Adesope, 2006).
Purpose of the Research

Accounting education has been criticized for not keeping pace with changes in teaching methods (Albrecht & Sack, 2000). This study is intended to add to the existing research available on the impact of Cooperative Learning and Concept Maps in accounting education. It differs in that it is intended to investigate the impact of two instructional strategies, Cooperative Learning and Concept Maps. As noted by Bennett (2010), "[o]ne responsibility we have as educators is to create learning situations that maximize student learning. One approach to maximizing student learning is selecting those instructional methods that have the most power to impact students learning...we can also integrate multiple instructional methods to compound the effect" (p. 5). A search of multiple databases found no research to date on the impact of combining both instructional methods within the framework of accounting education.

Results of this study will be used to guide my future teaching in accounting and could be passed on to other accounting educators who are part of the teaching and learning community. Identification of effective instructional strategies could impact future curriculum design within the overall university. Further, the results of this research may have implications for accounting educators globally as they struggle to reduce the attrition and failure rates of students enrolled in intermediate accounting. Finally, as a reflective practice, this research study is my attempt to create a meaningful learning environment for both myself and my students.

Research Questions

Using a quasi-experimental, pre-post test design, this study hopes to determine if, by combining well-researched instructional strategies, student learning in a university
intermediate accounting course will be improved. The following questions will be investigated:

1. Is the combined implementation of Concept Mapping and Cooperative Learning more effective than Direct Instruction and Cooperative Learning in improving student learning as measured by examination scores?

2. What are students' experiences with Cooperative Learning and Concept Mapping in intermediate accounting?

3. To what extent does the method of instruction affect students' perceptions in accounting?

**Format of the Thesis**

The first chapter of this thesis introduces the challenges students face in an intermediate accounting course so as to provide an understanding of what prompted this research. In addition, both the purpose of the research and the research questions are given. Chapter two provides a review of the literature on Cooperative Learning and Concept Maps. It covers both the foundations of Cooperative Learning and Concept Maps as well as research into how each of these instructional strategies impact learning and perceptions in accounting education. Chapter three explains the research methodology, including the characteristics of the participants, the design of the study, the experiment procedures, and the data collection methods. Chapter four presents an analysis of the data as well as the results. Chapter five provides a summary and conclusion of my research as well as a discussion on the limitations of this study and suggestions for future related research.
CHAPTER 2 - REVIEW OF LITERATURE

This chapter documents the literature review for this study. Three major areas are discussed: (1) the significance of Cooperative Learning as an instructional strategy, both generally and in relation to accounting education; (2) the effectiveness of Concept Maps to learning; and (3) studies on the impact of implementing Cooperative Learning and Concept Maps simultaneously.

Cooperative Learning

Cooperative Learning is an instructional strategy whereby small groups of students work together to maximize both their own learning and that of other group members. Cooperative Learning is not simply placing students into groups in order to work together. In fact, Bennett and Rolheiser (2001) note that "ill-conceived group work is one of the least effective approaches in the teaching and learning process" (p. 143). Instead, Cooperative Learning must be intentionally designed into the curriculum, supported by learning activities that utilize the Cooperative Learning structure (Barkley, Cross, & Major, 2004).

Cooperative Learning is one of the most researched instructional processes (Johnson, Johnson, & Stanne, 2000; Springer, Stanne & Donovan, 1999; Slavin, 1995). It has been shown to benefit students both emotionally and intellectually. Hattie (2012) ranks it as 28th out of 150 interventions that influence achievement. His research measures the average effect size of cooperative vs. individualistic learning as 0.59.
Foundations of Cooperative Learning

As noted by Johnson, Johnson, and Smith (1998), "[t]heory, research, and practice are Siamese triplets, each with a life of its own but joined inseparably to the others" (p. 28). Importantly, we must understand the theory behind the research and use of Cooperative Learning. The foundation of Cooperative Learning is linked to three theories: cognitive-developmental, behavioural, and social interdependence.

Cognitive-developmental theory supports Cooperative Learning because it emphasizes that children development cognitively only when they interact with others. Both Jean Piaget and Lev Vygotsky, developmental theorists, proposed that children developed cognitively within groups because other, more capable, group members model behaviours and share knowledge (Johnson et al., 1998; Slavin, 1995). Vygotsky theorized that a child who is in a group within his proximal zone of development will duplicate and learn from the behaviours modeled by the other group members (Salvin, 1995). Piaget researched the concept of conservation: some objects remain the same (a glass jar) while others change depending on the situation (water). Piaget's theorized that "[s]tudents will learn from one another because in their discussions of the content, cognitive conflicts will arise, inadequate reasoning will be exposed, and higher-quality understanding will emerge" (Slavin, 1995, p. 18).

Motivational theory focuses on rewards as an incentive for group behaviour. Slavin (1995) noted that Cooperative Learning is intrinsically goal oriented in that individual members only benefit if all group members are successful. He states that "to meet their personal goals, group members must help their group mates to do whatever helps the group to succeed, and, perhaps more important, encourage their group mates to
exert maximum effort" (p. 16). By having a common goal (the success of the whole group), "students encourage one another's learning, reinforce one another's academic efforts, and express norms favoring academic achievement" (p. 16). Behavioural theory's position is that rewards that are extrinsic motivate group members to demonstrate behaviours that are beneficial to the group as a whole.

Social interdependence theorists state that members of a group are always interdependent on each other. That interdependence can take three forms: positive, which is cooperative, negative, which is competitive, or absent, which is independent. Only positive interdependence creates promotive interaction, in which "individuals encourage and facilitate each other's efforts to learn" (Johnson et al., 1998, p. 29). Johnson et al. (2006) sum up the concept of social interdependence by stating that group members must "believe they sink or swim together" (p. 17). Under this theory group members are intrinsically motivated to support the learning of all group members.

Although all three theories build on different premises, they all support learning cooperatively in that "[t]hey all predict that Cooperative Learning will promote higher achievement than will competitive or individualistic learning" (Johnson et al., 1998, p. 29).

**Key Components of Cooperative Learning**

Johnson et al. (2006) note that Cooperative Learning can only be successful when the group structure actively promotes students working together. Slavin (1995) states that Cooperative Learning, if not implemented properly, has pitfalls (e.g., the free-rider effect). Barkley et al. (2004) list multiple issues that can be experienced in groups, such as student resistance, off-task behaviour, and groups that do not get along. Many of these
potential problems would not occur if cooperative learning is correctly structured and supported by the instructor. Johnson et al. (2006) identify the five basic elements that must be present to ensure the success of Cooperative Learning: Positive Interdependence, Individual and Group Accountability, Promotive/Face-to-Face Interaction, Interpersonal/Small Group Skills, and Group Processing.

Positive Interdependence means “…students [are] working together in supportive (positive) ways and being accountable and caring for each other” (Bennett & Rolheiser, 2001, p. 152). Group members must amalgamate their efforts to complete a task in order to receive joint rewards. Johnson and Johnson (1992) note that outcome interdependence and means interdependence are two facets of positive interdependence. Outcome interdependence includes both reward and goal interdependence. Means interdependence includes resource, role and task interdependence. Each resource only contains partial information; each person’s role is reliant on another person’s function; and, each task is assigned to only one group member.

Without collaboration and sharing, the group will be unable to complete their task. Johnson et al. (2006) note that "[i]f there is no positive interdependence, there is no cooperation" (p. 17). Positive interdependence requires that instructors provide students with a clear and specific description of the task along with an explanation of the group goal. The group goal conveys that group members are in this together and need to be as concerned with other group members' understanding of the material as they are with their own (Johnson & Johnson, 1999).

Individual accountability requires that each member can demonstrate that they mastered the material. Johnson and Johnson (2004) note that "any student’s work may be
selected as representative of the group for assessment; therefore, passive students will not succeed in this group composition, as each student has a vested interest in the group’s success" (p. 58). Although each individual member has a goal to support learning within the group, the group goal is to complete the task assigned. This requires that goals be clearly stated and measurable, both on an individual and group basis. Groups must be assessed by the instructor but individual assessment can also be self or peer assessment. Importantly, however, "[w]hat teachers assess may be the single most powerful message as to what teachers value and wish to accomplish” (Johnson & Johnson, 2004, p. 40). "Academic learning, reasoning, skills competencies, attitudes or work habits are the most common assessment targets" (p.40).

Promotive/Face-to-Face Interaction maximizes opportunities for students to help, assist, encourage and celebrate other group members’ successes. "Doing so entails cognitive processes such as verbally explaining how to solve problems, teaching one's knowledge to classmates, and connecting present with past learning" (Johnson et al., 1998, p. 30). Note that positive interdependence is closely linked to promotive interaction in that students who work together in a supportive environment will interact in order to ensure the success of all group members. Promotive interaction supports the development of interpersonal relationships that lead to increased learning and social skills (Johnson & Johnson, 2003). Tasks and activities where students orally explain how to problem-solve, teach others, check for understanding, discuss concepts, and connect current with past learning increase face-to-face interaction and should be structured into group tasks. "It is through promoting each other's learning that members become
personally committed to one another as well as to the mutual goals" (Johnson & Johnson, 2003, p. 97).

Interpersonal/Small Group Skills are essential in Cooperative Learning but merely arranging students into groups does not mean they can function as a group. "Group members must know how to provide effective leadership, decision-making, trust-building, communication, and conflict-management, and be motivated to use the prerequisite skills" (Johnson et al., 2006, p. 18). Social skills such as praising, asking and giving information, and asking and giving help should be taught explicitly so that students know what these skills look and sound like (Johnson & Johnson, 1999). Conflict resolution skills, most challenging of all social skills, should be demonstrated and taught so that students know how to deal with conflict in a way that promotes discussion and supports learning.

Group Processing is the evaluation, by the group, of both the achievement of assigned goals and the relationships within the group (Johnson et al., 2006). Group processing allows groups to review past relationships and make changes for improvement. Group members can give feedback on the contributions of other, thereby reinforcing positive behaviours. Key here is that instructors monitor and provide feedback on both individual group members as well as on how the group is working together (Johnson et al., 2006). Group processing can therefore become part of the explicit teaching of interpersonal and small group skills.

Cooperative Learning Design

Extensive research shows that Cooperative Learning, regardless of the method used, has positive effects (Salvin, 1995). Johnson et al. (2000) conducted a meta-
analysis of eight Cooperative Learning methods using 158 effectiveness studies which were empirically tested. Although all eight methods had a positive impact on student achievement when compared to competitive and individualistic learning, the Learning Together model of Cooperative Learning had the greatest effect. Johnson et al. (2000) also ranked the eight Cooperative Learning methods based on the following criteria: ease to learn, ease of initial use, ease to maintenance long-term, applicability re: subject and grade level, and adaptability to changing conditions. The Learning Together model was ranked first out of the eight Cooperative Learning methods. Note that all eight Cooperative Learning methods reviewed did not have the same number of studies and the authors note that "[t]he confidence educators can have in the effect sizes...is inversely related to the number of studies that have been conducted on the method" (Johnson et al., 2000). Of the 196 studies used, the Learning Together method accounted for 42%, providing additional support for its use. For this reason, I chose the Learning Together method for this research study.

**Effectiveness of Cooperative Learning**

Cooperative Learning has been researched for more than 25 years. Past research has shown that, when properly implemented, Cooperative Learning can lead to improvements in achievement, self-esteem, attitudes towards the subject, and communication skills (Johnson & Johnson, 1999; Slavin, 1995). As previously noted, Hattie (2012) reviewed over 27 meta-analysis which show an average effect size on achievement of 0.59. Johnson et al. (2000), in their meta-analysis of 26 studies of cooperative learning vs. individualistic learning, showed an average effect size of 0.85 on academic achievement for the Learning Together method.
Springer et al. (1999) researched small-group learning in undergraduate science, mathematics, engineering and technology. Their meta-analysis of 39 field studies found that small-group learning had significant and positive effects on achievement, retention, and attitudes towards learning (respective average effect sizes of 0.51, 0.46, and 0.55). They note that "[t]he 0.51 effect...would move a student from the 50th percentile to the 70th on a standardized...test. Similarly a 0.46 effect on students' persistence is enough to reduce attrition...by 22%" (p. 38). Their findings with regards to improved attitudes towards learning were particularly significant given that science, math, engineering, and technology are areas of study that students perceive to be exceptionally challenging.

In order to appropriately assess the impact of Cooperative Learning, and specifically Learning Together method, in accounting education, research studies that specifically indicated the use of the five essential elements of Cooperative Learning were reviewed. Four studies comparing Cooperative Learning (experimental group) to lectures (control group) were found.

Caldwell, Weishar, and Glezen (1996) studied both performance and perceptions of accounting. Their study was quasi-experimental, included a pre- and post-tests, and ran for one semester. A total of four classes, two of Accounting Principles I and two of Accounting Principles II, were included. In each course, one class was the experimental class and the other was the control class. The experimental group of Accounting Principles I students showed only a marginally better performance; however, students in the experimental group maintained significantly more positive perceptions of accounting. In Accounting Principles II, the performance of the experimental group and the control group were not statically different, nor was there a statistical difference in the group's
perceptions of accounting. Caldwell et al. (1996) proposed that this may be because students had already solidified their negative perceptions when they attended lectures in the Accounting Principles I course.

Hwang, Lui, and Tong (2005) research focused on academic performance in four classes of intermediate accounting, two control (lecture) and two experimental (cooperative learning). Their study was limited to one three-hour class and involved only a post-test. The post-test was multiple choice and included direct application questions as well as more difficult indirect questions. The experimental group outperformed the control group on the direct application questions but the difference was not statistically significant. The experimental group outperformed the control group on the indirect questions and the results were statistically significant. The authors note that "cooperative learning can enable participants to solve indirect... questions that require a higher level of understanding of the subject." (p. 160).

Hwang, Lui, and Tong (2008) replicated their research with a different cohort of accounting majors and using cases with supporting calculations instead of multiple choice questions. Again, the research was limited to one three-hour class and included only a post-test. The post-test included direct application problems as well as analysis problems. In this follow up study, the experimental group significantly outperformed the control group on both the direct and analytical problems. The authors note that "[t]he result suggests that cooperative learning enhances participants' ability to solve analysis level questions that require a higher level of understanding of the subject matter” (p. 73).

Opdecam and Everaert (2012) focused their research on the perceptions of students in an intermediate accounting course as well as on time spent outside of class. In
order to evaluate if additional time outside of the class was efficient for students they included a measure of performance. Their study was quasi-experimental, included a pre- and post-test and ran for 10 weeks. In the third week of the course, students were permitted to choose between attending tutorials using either cooperative learning or lectures.

Student surveys showed that students in the experimental group spent significantly more time outside of class. In addition, they reported higher levels of satisfaction and a more positive course experience than students in the control group. The experimental group significantly outperformed the control group but the increased performance was correlated to time spent outside of class: "the more time spent by students, the higher the exam score" (Opdecam and Everaert, 2012, p. 68). One limitation of this study is the possible self-selection bias created through the self-selection process. The researchers included covariates in their tests in order to adjust for this possibility.

**Concept Maps**

A Concept Map is a graphic organizer used to organize information for the purposes of making meaning (Bennett & Rolheiser, 2001). Concept Mapping is an instructional strategy whereby knowledge is represented graphically. Novak and Gowin (1984) note that a Concept Map is "an educational tool...developed specifically to tap into a learner's cognitive structure and to externalize...what the learner already knows" (p. 40). As with Cooperative Learning, Concept Maps must be intentionally designed into the curriculum and instructors must have a deep understanding of concept mapping to support students in the use of concept maps for learning (Bennett, 2010). There is
extensive research on the impacts of Concept Maps (Horton et al., 1993; Nesbit & Adesope, 2006; Novak & Gowin, 1984; Novak, 2010). The benefits of concept mapping include increased comprehension, critical thinking, and achievement (Novak & Gowin, 1984). Hattie (2012) ranks it as 27th out of 150 interventions that influence student achievement. His analysis measures the average effect size of concept mapping as 0.60.

**Foundation of Concept Maps**

Concept Maps are advanced organizers that correspond to David Ausabel's assimilation learning theory (Novak, 2010). The theory postulates that new knowledge must be connected to previous knowledge in order to result in meaningful learning. A learner’s ability to assimilate new knowledge will depend on both the quantity and quality of existing knowledge structures (Novak, 2010). For instance, an expert learner has both quantity and quality knowledge structures on which to "hook" new knowledge, resulting in learning being less effortful. Note that this is not connected to intelligence but rather to the strength and complexity of the expert's existing knowledge structures. Learning for novice learners is more effortful because they have fewer existing knowledge structures and those they do have are less robust. Logically, novice learners find it difficult to "hook" new knowledge to existing knowledge. When assimilating new knowledge into previous knowledge, both expert and novice learners reorganize and strengthen their knowledge structures. This allows meaningful learning to takes place.

Ausubel theorized that the assimilation of new knowledge was optimized "when the most general, most inclusive concepts are introduced first and then these concepts are progressively differentiated in terms of detail and specificity” (Novak, 2010, p. 70). By first determining the meaning of more general and inclusive concepts learners can use...
these basic cognitive structures to "hook" on the details, allowing them to expand on the original inclusive concept, leading to greater clarity and understanding. As noted by Novak and Gowin (1984), "meaningful learning proceeds more easily when new concepts or concept meanings are subsumed under broader, more inclusive concepts" (p. 15).

**Key Components of Concept Maps**

Concept Maps are a graphical representation of knowledge structures. Concepts, which are defined as regularities observed by a person, are used as nodes (Novak & Gowin, 1984). Multiple nodes representing different but related concepts are linked with lines labeled to represent the relationship between the concepts. Two concepts linked with a label produce a proposition. A proposition indicates what an individual understands (Novak & Gowin, 1984).

The linking words used to produce a proposition can be either dynamic, indicating cause and effect, or passive/descriptive (Bennett & Rolheiser, 2001). Passive linking words are at a less complex level of thinking; remembering, understanding, and applying on Bloom's Taxonomy. Dynamic linking words are at a more complex level of thinking: analyzing, evaluating, and creating. For example, the accounting concepts assets and debits can be linked with words or phrases that are either passive (a fact) or dynamic (a cause and effect). Both result in a proposition but the use of the dynamic linking word is at a higher level of thinking because it shows the impact of one concept on another. Novak (2010) notes that linking words are the most difficult aspect of concept mapping for students.
Novak and Gowin (1984) note that concept maps "require students to perform on all six "levels" [of Bloom's Taxonomy] in one composite effort" (p. 23). Since concept maps externalize both the knowledge of the student as well as the structure of that knowledge, they can be used as an evaluation tool with regards to the student's levels of thinking.

Concept maps begin with subsumers (Novak, 2010). These are general inclusive concepts that are broad in nature (for example, "chair"). They play an important role in acquiring new knowledge because they allow learners to categorize new knowledge onto existing knowledge structures. Subsumers are not static: as new information is added, subsumers are altered and often become more general and inclusive. For example, the addition of the concept stool (3 legs) to that of chair (the subsumer) changes the concept "chair" to be more inclusive.

Concept maps must have progressive differentiation (Novak, 2010). This means that concept maps move from subsumers to more specific concepts. For instance, in
accounting, the concept "assets" may be linked to the concept of "legal rights" with the linking word "include". This might lead to additional questions. Which assets are legal rights? Why are they considered legal rights? How is a legal right protected? What evidence is there that you have a legal right? In order to obtain the answers to these questions the learner must move from the more general concept (legal rights, which is already subsumed under the more general concept of assets) to specific concepts that are subsumed under "legal rights". This is why differentiation is progressive: as the learner differentiates the structure of knowledge progresses and becomes more detailed and specific. "Subsumption and progressive differentiation lead to...qualitative changes in that each of the concepts in the relevant structure are modified in meaning to some extent" (Novak, 2010, p. 71). It is because of progressive differentiation that concept maps are hierarchical.

Concept maps must also have integrative reconciliation (Novak, 2010). Integrative reconciliation creates cross-links on a concept map because two previously unrelated concepts are now seen as related. When new knowledge is added the existing knowledge structure alters and new cross-links can be built into the knowledge structure to further meaningful learning. It is therefore "important to recognize that a concept map is never finished" (Novak & Canas, 2006, p. 12). New knowledge becomes part of an assimilation process that modifies the new concept being added as well as some or all of the concepts in the existing knowledge structure (Novak & Gowin, 1984).

**Concept Map Design**

Research has shown that self-constructed concept maps have the greatest impact on student learning (Horton et al, 1993; Nesbit & Adesope, 2006). Novak (2010) "found
that to benefit from concept maps...learners needed to construct their own maps and learn this method of organizing their own knowledge" (p. 35). This is because the construction of the concept map is when meaningful learning occurs (Novak & Gowin, 1984). Nesbit and Adesope (2006) found that the average effect size on student achievement from self-constructed maps in postsecondary education was 0.773. Yet Maas and Leauby (2005) note that the use of concept mapping in accounting education is problematic because of "the amount of time it takes to learn the methodology, the effort to teach students how to construct concept maps, and the process to integrate the tool into courses" (p. 84).

In addition, teaching concept mapping to university students is challenging due to their propensity to focus on rote learning (Novak, 2010). Finally, the institution where the study took place did not allow the researcher to devote class time to the development of concept maps due to concerns regarding content coverage. For these reasons, this research study focused on the use of expert-developed concept maps developed by the researcher/instructor. Research supports the use of expert-developed concept maps. Of the 55 studies included in Nesbit and Adesope's (2006) meta-analysis, 30 involved the use of expert-developed concept maps. The average effect size on student achievement, as measured by retention, was statistically significant at 0.363.

Effectiveness of Concept Mapping

Nesbit and Adesope (2006) identify that we have a significant increase in research on concept mapping over the last 20 years. This is unsurprising given that concept mapping is shown to create understanding, improve retention and critical thinking skills and is perceived as beneficial by users (Horton et al., 1993; Nesbit & Adesope, 2006). In order to appropriately assess the impact of expert-developed concept maps in accounting
education, a search was conducted using ERIC. In addition, Accounting Education Literature Reviews from 1997 to 2012 were reviewed. Seven studies on the implementation of concept maps into accounting education were found (Chen, Ching, Chen, & Cho, 2003; Chiou, 2008; Irvine, Cooper & Jones, 2006; Leauby & Brazina, 1998; Leauby, Szabat & Maas, 2010; Maas & Leauby, 2005; Simon 2007). Six of these seven studies involved student-constructed concept maps and where therefore not considered within the context of this study. One study warranted further review as it included the use of expert-developed concept maps.

Simon (2007) used concept maps in an upper-level accounting theory course in one lecture and two tutorials. Instructor prepared concept maps were provided to students and used in the lecture as well as in supporting tutorials. At the end of the lecture, students were given incomplete instructor-prepared concept maps covering additional content that were then given as a quiz during the tutorial which followed. In addition, students were asked to complete their own concept maps on a challenging concept on a volunteer basis. One third of the students did so and the instructor assessed the maps and provided feedback. Simon (2007) found that weaker students produced maps with limited concepts and linking words whereas stronger students produced maps that were more robust. Surveyed students found the maps useful for learning but the study did not measure student performance.

Due to the limited amount of studies on the impact of expert-developed concept maps in accounting, a further review of two meta-analyses (Horton et al., 1993; Nesbit & Adesope, 2006) was completed. Three of the studies included in Horton et al. (1993) meta-analysis used expert-developed concept maps. Two of the studies took place in
high school biology and one in Grade 5 reading. Achievement outcomes were measured against a control group that received direct instruction without concept maps. The effect size on achievement ranged from 0.48 (biology) to 0.70 (reading), with an average effect size of 0.59. Only one study included attitude towards the usefulness of concept maps, with an effect size of 0.32 (biology). Of the 55 studies included in Nesbit and Adesope (2006) meta-analysis seven used expert-developed concept maps compared to outlines, lists or text passages in a classroom setting. All were conducted in post-secondary level science courses. Performance was based on researcher-constructed achievement tests and the average effect size of using expert-developed concept maps was 0.366. Nesbit and Adesope (2006) state that "concept maps can be more effective than text passages for conveying detailed information" (p. 434).

**Effectiveness of Cooperative Learning and Concept Mapping**

Using an extensive search of both the ERIC database as well as Accounting Education Literature Reviews from 1997 to 2012, I was not able to locate any research on expert-developed concept maps in conjunction with cooperative learning in accounting education. As a consequence, a further review of Nesbit and Adesope's (2006) meta-analysis was conducted. Specifically, I reviewed the effect size of studying expert-developed concept maps within a classroom environment at a post-secondary level within cooperative groups. Nesbit and Adesope (2006) found an average effect size of 0.192 for cooperative groups studying expert-developed concept maps compared to 0.42 for individuals studying expert-developed concept maps. The authors note that "[d]espite the non-significant mean effect size for...cooperative studies, it is too soon to conclude that concept maps are no better than other formats for use as communication aids in
cooperative learning" (p. 431). They indicate that the type of task and the way cooperative learning is structured may have significant impacts on the results of previous studies. They also note that "students who do not have strategies for cooperative problem solving with maps may be unable to exploit their advantages" (p. 431). For instance, in one of the research studies included in the analysis the effect size on academic achievement was 0.65 for the experimental group who were provided with training on how to use concept maps within their cooperative groups compared to an effect size of 0.29 for groups that were given no training (p. 431).

As noted by Bennett and Rolheiser (2001) "[e]ffective group work is complex. It takes thoughtful work over time in order to achieve results" (p. 143). Similarly, Bennett (2010) notes that concept maps are one of the most powerful instructional strategies with regards to impact on learning but also the most complex and difficult to implement. Nesbit and Adesope (2006) note that additional research is necessary into how pre-constructed concept maps combined with cooperative learning impact both student performance and attitudes. This study hopes to further research in this area.
CHAPTER 3 – METHODOLOGY

In this chapter, I begin by reviewing the purpose of the study followed by the three questions that guide this study. Then, I will share the research methods employed to answer each of my research questions and to guide the analysis of the data in chapter four.

As stated in chapter one, the purpose of this study is to determine the impact of two different approaches to teaching a university-level accounting course. In one class students were instructed using both Concept Maps and Cooperative Learning. In the other class students were instructed using Direct Instruction and Cooperative Learning. The specific questions developed for this study are stated below.

1. Is the combined implementation of Concept Mapping and Cooperative Learning more effective than Direct Instruction and Cooperative Learning in improving student learning as measured by examination scores?

2. What are students' experiences with Cooperative Learning and Concept Mapping in intermediate accounting as measured by a survey?

3. To what extent does the method of instruction affect students' perceptions in accounting as measured by a survey?

Research Methods

In this study, I employ a mixed methods approach to the collection and analysis of the data. Johnson, Onwuegbuzie, and Turner (2007) note that mixed methods research is used “for the purpose of breadth and depth of understanding” (p. 123). Green (2007) indicated it provided “multiple ways of seeing and hearing…and multiple standpoints on what is important” (as cited in Creswell & Clark, 2007, p. 4). As my research questions explore both the impact on learning as measured by student outcomes as well as the perceptions of students, I chose to use a mixed methods approach for this study.
My first question employs a quantitative, quasi-experimental pre-test/post-test design. Quantitative research is used when a researcher is studying the effect of an intervention on an identified problem (Creswell, 2008). This type of research uses statistical analysis to determine the relationship between the independent and dependent variable on a population. Quantitative research is considered quasi-experimental “when researchers need to use intact groups…or because the setting prohibits forming artificial groups” (p. 312). At the beginning of the study, pre-tests are administered to both groups. The experimental group then receives the treatment and, at the end of the study, a post-test is used to assess the change between the two groups (Creswell, 2008).

I chose to use quantitative research because, from my teaching experience, I have gained an understanding of the problems that students face when struggling to learn accounting concepts. As the university does not allow random assignment of students to control and experimental groups, the use of intact classes makes this research quasi-experimental. One class served as the control group (25 students) and the other as the experimental group (37 students). A pre-test/post-test design was used to measure the change within each group. All students wrote a pre-test at the beginning of the first class to assess their knowledge. After implementing different instructional strategies to both groups, a posttest was administered to assess the differences between the two groups at the end of the study.

The second question in my study employs a qualitative approach to data collection through the use of surveys. Qualitative research explores the experiences of participants, allowing the researcher to gain a better understanding of the phenomenon being studied (Creswell, 2008). Creswell and Clark (2007) note that, in mixed methods
research, qualitative data allows the researcher to gain an understanding of the participant’s perspective of the treatment. Opedecam and Everaert (2012) note that "[i]t is…important to consider information concerning student satisfaction and course experience when educators design and construct the learning environment” (p. 54).

Therefore, in order to better understand the student experience with regards to cooperative learning, both the control and experimental group completed a survey about their thoughts and feelings towards group work. In addition, the experimental group completed a second survey to better understand their thoughts and feelings about the use of expert-developed concept maps.

The final question in my study used surveys in a pre-test/post-test format. One survey was administered to all students at the beginning of the course to gain a better understanding of students’ perceptions of accounting. In order to determine if the different instructional strategies altered students’ perceptions, the identical survey was given to all students at the end of the course.

**Research Participants**

The participants in this study were undergraduate Bachelor of Commerce students enrolled in an intermediate accounting course in a four-year degree program at a Canadian university.

**Control Group Characteristics** At the start of the course, 54 students registered in the control group. By week seven, a total of 20 students had dropped the course and 34 students remained. Another two students dropped the course after the midterm, resulting in 32 students writing the final exam. After the data was collected and reviewed, an additional seven students were excluded from the study because they did not
write either the pretest or the posttest, resulting in a sample of 25 students in the control group. There were 16 male and 9 female students. None of the students in the control group had exceptionalities.

**Experimental Group Characteristics** At the start of the course, 55 students were registered in the experimental group. By week seven, a total of 11 students had dropped the course and 44 students wrote the midterm exam. An additional two students dropped the course after the midterm, resulting in 42 students writing the final exam. After the data was collected and reviewed, five students were excluded from the study because they had not written either the pretest or the posttest, resulting in a sample size of 37 students in the experimental group. There were 17 male and 20 female students. The experimental group had 3 students with exceptionalities. These students were given time and a half to write the pre-test, post-test, midterm and final exam.

**Quantitative Instruments**

The following quantitative research instruments were applied.

**Pre-test/Post-test** A pre-test was administered to both the control and experimental groups in the first class prior to any instruction. The pre-test was designed by the researcher/instructor to assess the ability of the participants to apply the knowledge obtained in introductory accounting. The pre-test included 25 multiple-choice questions (See Appendix A). Some of the questions were designed by the researcher/instructor, and the remaining questions were adopted and modified from a test bank provided by the publisher of an introductory accounting textbook. Two accounting instructors reviewed the pre-test for the level of difficulty.
The post-test was the same as the pre-test and was administered to the participants at the beginning of the last class. An alternative version of the test was not considered necessary given the 12 week span between the pre-test and the post-test. A research assistant was responsible for both the distribution and collection of the pre-test and post-test and the instructor was not present when the tests were written. Students were advised by the research assistant that they had the right to refuse to write the test and that the instructor would not know which students refused.

To ensure that students were able to refuse without being identified, the tests were distributed in an envelope that they returned to the research assistant at the end of the time. The research assistant graded both tests and input the grades into the course management system (Blackboard). At the end of the semester, after all the grades were submitted, the tests were sorted into the control and experimental groups and returned to the instructor.

Midterm and Final Exam. Both the experimental and control groups wrote a midterm in week 7 and the final exam in week 14. Both groups wrote a common midterm and final exam at the same time in the same location. The midterm was developed by the researcher/instructor and reviewed by the course coordinator to ensure appropriate content and level of difficulty. The midterm was problem-based and included both objective (calculations) and subjective (conceptual) questions. The final exam was written by the course coordinator to minimize instructor/researcher bias and included a mix of objective and subjective questions. In order to ensure the anonymity of the participants and an unbiased grading of both assessments, the midterm and final exam were distributed and collected by the research assistant. All student identifiers
were removed and, using random numbering, the assessments were coded before they were provided to the instructor, in random order, for grading. Assessments were returned to the research assistant for input into Blackboard. The instructor had no access to Blackboard at any time during the research study. In addition, the instructor had no access to student specific grade information. At the end of the semester, after all the grades were submitted, the midterm and final exam were sorted into the control and experimental groups and returned to the instructor.

Note that the midterm and final exam would have been included in the appendix but university policy prevents them from being included.

**Qualitative Instruments**

The following qualitative research instruments were applied.

**Perceptions of Accounting Surveys** Two paper and pencil surveys were administered to students on the first and last day in the course. The surveys were adapted from a study by Caldwell et al. (1996) and another by Geiger and Ogilby (2000). The surveys included 17 questions that assessed students’ perceptions of accounting using a five-point Likert scale ranging from strongly agree ("1") to strongly disagree ("5"). In addition, students were asked to predict the grade they expected in the course. The initial survey gathered demographic information such as gender, age, and discipline (see Appendix B). The second survey was reworded to reflect past tense and the demographic portion was omitted. A research assistant administered and collected the surveys using the same methods as for the pre-test and post-test.

**Thoughts/Feelings towards Group Work Survey.** A survey was administered to students in both the control and the experimental groups two weeks before the final exam
(see Appendix C). This paper and pencil survey assessed students’ thoughts and feelings towards group work. The survey was adapted from a study by Cantwell and Andrews (2002). A total of 30 questions were included and students responded using a five-point Likert scale ranging from "not at all true of me" ("1") to "very true of me" ("5"). A research assistant distributed and collected the surveys using the same methods as noted previously.

**Thoughts/Feelings towards Concept Maps Survey.** A pencil and paper survey was administered to students in the experimental group two weeks before the final exam (see Appendix D). The survey as adapted from a study by Rabie (2007) and consisted of 30 questions. Students responded using a five-point Likert scale ranging from "not at all true of me" ("1") to "very true of me" ("5"). As noted previously, a research assistant distributed and collected the surveys using the same methods as all previous tests and surveys.

**Data Collection Procedures**

This research focused on the implementation of Concept Maps and Cooperative Learning in one section of intermediate accounting. The control group in the study was another section of intermediate accounting taught using Direct Instruction and Cooperative Learning. Both the control and experimental groups used the same textbooks, covered the same content and were given the same assignments and assessments. Both control and experimental groups were taught by the same researcher/instructor. The duration of the study was a fourteen week course in intermediate accounting.
Two days before the start of the course students received an informed consent letter by email (Appendix E). The email was sent by the researcher/instructor with a copy attachment to the administrative assistant to the chair of the accounting department. The administrative assistant was the individual who was noted in the consent letter as the contact for students who wished to withdraw from the study.

In week one of the course, the research assistant administered the pre-test and the first survey on students' perceptions of accounting at the beginning of the class. At the end of the first class, the instructor distributed paper copies of the expert-developed concept maps to the experimental group in preparation for the following week's class (see Appendix F). In the control group, paper copies of the instructor-developed Power Points were distributed (see Appendix G). Students were advised that they were not permitted to share their resources with any other intermediate accounting students being taught in other classes during the same semester.

In week two, students in both the control and experimental class formed self-selected cooperative groups of no more than four and no less than three students. The researcher/instructor then spent approximately 30 minutes discussing key elements of effective groups. Students were advised that interpersonal and small group skills would be explicitly addressed on a weekly basis.

In every class, the researcher/instructor utilized the paper copy of either the expert-developed concept maps (experimental) or the Power Points (control) using the document camera. This ensured that students were visually receiving the information in the same way (paper projected on a screen.) The researcher/instructor referred to either the expert-developed concept maps or the Power Points regularly while teaching the
concepts. During each session, textbook problems were assigned and time was provided to solve the problems within the cooperative groups (face-to-face promotive interaction). Individual groups were randomly chosen to present their solutions (positive interdependence). The researcher/instructor tracked which groups had provided solutions to ensure all groups contributed. Group solutions were either displayed on the document camera and presented by the group members or were written on the whiteboard.

The same procedures and problems were used in both classes (control and experimental). In addition, during every class, the instructor emphasized different group skills such as communication or conflict management. At the end of the class in weeks four, six, nine, and eleven, groups were given 15 minutes for group processing.

In week seven of the course, students wrote the common midterm. In week twelve, the research assistant returned to both classes to administer the feelings about group work survey (both control and experimental groups) as well as the feelings about concept maps survey (experimental group only). In week thirteen, the research assistant returned to both classes to administer the posttest as well as the second survey on students’ perception of accounting. In week fourteen, the students wrote a common final exam.

Data Analysis

The data collected was analyzed using mixed methods to assess the effect of the teaching strategies and address the three research questions.

Quantitative analysis

The quantitative data consisted of the pre-test, post-test, midterm and final exam. First, the pre-test for both the experimental and control groups were tested for
equivalency. Equivalency is required in statistical analysis as non-equivalent groups do not have a baseline from which to perform statistical analysis. A test of equivalency was necessary due to the high dropout rate in the control group. This may have been an indication of experimental mortality. An independent t-test was used to determine if there was a significant difference between the means of two groups. An alpha level of 0.05 was used to judge significance.

The t-test for equality of means indicated there was a statistically significant difference between the pre-test of the experimental and control groups ($p = .001$). As noted previously, this may have been caused by a high dropout rate in the control group as well as the difference in the sample size of the two groups (experimental, $N=37$, control, $N=25$). As a result, independent t-tests to compare the posttest, midterm and final exam between the control and experimental groups could not be performed.

A comparison of the gain scores of the control and experimental groups was performed. The gain score was calculated as the difference between the pre-test and post-test scores for each student. By using gain scores, the differences in the pretest scores between groups were held constant. A one-way ANOVA using experimental and control groups gain scores as the only factor was used to determine if the treatment was significant. An alpha level of 0.05 was used to judge significance.

Next, a paired sample t-test compared the pre-test to the post-test, midterm and final exam within each group to determine if this was a statistically significant difference. A paired sample t-test indicates significance, the likelihood that a result will be different from what we expect. Significance does not indicate the direction or magnitude of a change. Therefore, I also calculated the effect size. Effect size indicates the size of a
gain, the power of change between two variables (Howell, 2011) and can be used to compare different results or research outcomes.

We have a number of different ways of calculating effect size. Cohen's $d$ is often used as it provides a rule of thumb that can be used to gauge the size of the effect: $0.20 = \text{small}$, $0.50 = \text{medium}$, and $0.80 = \text{large}$ (Howell, 2011). One issue with the use of Cohen's $d$ is that it over-estimates the effect on a population when sample sizes are small (Howell, 2011). Hedge's $g$ was developed to correct for the upward bias found in Cohen's $d$. As the sample sizes in this research study are less than $N=50$ (experimental $N=37$, control $N=25$), I have used this more conservative measure of effect size.

Finally, Pearson's product-moment correlation coefficient ($r$) will be analyzed for the pre-test, post-test, midterm and final exam. Correlation measures how well independent variables are related. The measurement ranges from -1 (a negative correlation where the values move in opposite directions) to 1 (a positive correlation where the numbers move in the same direction). A measure of 0 would indicate a random relationship with no correlation. Howell (2011) notes that "[t]he correlation coefficient must be interpreted cautiously" (p. 200). First, he notes that the correlation coefficient is a "point on a scale...and the closer it is to either of...[the]...limits, the stronger is the relationship between the two variables." In addition, he notes that other, unknown, underlying variables may impact the correlation calculation. The correlation could therefore mistakenly be attributed to the independent variable. By performing multiple tests on the variables, we gain a more robust understanding of the inter-relationship of those variables.
Qualitative analysis

A separate analysis was required for the results of the surveys (students’ perceptions of accounting, feelings towards group work and feelings towards concept maps). Each survey used a Likert scale to indicate students’ perceptions or feelings. Likert scales provide ordinal data meaning that "the response categories have a rank order, but the intervals between values cannot be presumed equal" (Jamieson, 2004). The use of statistics, which is appropriate for nominal, interval or ratio data, "increases the chance of coming to the wrong conclusion" (p. 1217) when used for ordinal data. Allen and Seaman (2007) note that, if all responses were at the extremes (strongly agree, strongly disagree), the use of means would result in a measurement of "same", leading to incorrect conclusions. Jamieson (2004) notes that "non-parametric tests should be employed if the data is clearly ordinal" (p. 1218). Howell (2011) states that ordinal data must be analyzed using non-parametric measures such as rank, median and frequency.

Given frequency is commonly used for ordinal data, all surveys in this study were analyzed using frequency. For the perceptions of accounting survey, which was administered both at the beginning and end of the course, frequencies of the two surveys were compared for changes.

The volume of data when frequency is used at all five levels of the Likert scale is difficult to analyze and interpret. Therefore, Likert scales were collapsed into three data sets: agree, unsure and disagree (in the case of the feelings towards group work and concept maps the scales were collapsed into "not at all true of me", "unsure", and "very true of me"). In addition, when using measures of frequency, Likert scales can be grouped for common parameters (Allen & Seaman, 2007). Caldwell et al. (1996) note
that "[w]hile the use of a multiple-item instrument increases validity and reliability over a single-item instrument, the statements may represent several underlying dimensions" (p. 28). By performing a factor analysis, common characteristics can be found and questions coded and grouped. The Likert scales for the questions that tested common characteristics were summed and analyzed to gain a clearer understanding of the perceptions of students towards accounting, group work and concept maps. In this research study, I used surveys adapted from past research where factor analysis was performed. Therefore, I coded the questions based on the original research factor analysis for common characteristics. I then analyzed the characteristics using frequency as my chosen non-parametric procedure.

**Ethical Considerations**

As a researcher/instructor, I must consider potential risks involved in my research and how I can minimize those risks. In addition, I must consider ethical issues that may arise during the course of my research.

Participants in this research study were given an informed consent letter to ensure that they understood both the purpose behind the research and that the results may be published. Participants were made aware that they could withdraw from the study at any time without adverse consequences. Students were made aware that they had the right to refuse to complete the pre-test, post-test and any of the surveys and that doing so would not adversely affect their grade. Students were given the option, at any time during the course of the study, to withdraw from the sections involved in the research and transfer to another section with another instructor with no impact on their grades.
Confidentiality and anonymity of the data and other student responses were maintained throughout the study. Student assessments that were included in the study had all student identifiers (including names and students numbers) removed before the instructor/researcher was given the data. The instructor/researcher made every effort during the research to ensure that students were in a comfortable, enriching, and safe environment.

During the course of the research, the instructor had no access to student grades. Although the instructor/researcher did mark the midterm and final exam, student identifiers were removed before the assessments were provided to minimize bias. In addition, assessments from both the control and the experimental groups were collected together and randomized so that the researcher/instructor had no knowledge of which assessment belonged to which group. The research assistant retained and recorded grades in the course management system and the instructor/researcher had no access to this system or student specific grades at any time during the research process.

All collected data was secured in a locked file and was destroyed after completion of the study. If a participant withdraw from the study, all data collected relating to that participant was destroyed.
Chapter 4: RESULTS AND FINDINGS

The purpose of this study was to examine the impact of implementing Concept Maps and Cooperative Learning as compared to Direct Instruction and Cooperative Learning in an intermediate accounting course in a Canadian university. Quantitative data was analyzed to determine the impact on student learning as measured by examination scores. Qualitative data was analyzed to determine the impact of the teaching strategies on students’ perceptions of accounting as well as their thoughts and feelings towards group work and concept mapping. This chapter discusses the analysis of the data collected, grouped into quantitative and qualitative data, in order to frame an answer to my three research questions.

Quantitative analysis

The first research question asked if the combined implementation of Concept Mapping and Cooperative Learning was more effective than Direct Instruction and Cooperative learning in improving students learning as measured by examination scores.

A test of equivalency determines whether the control and experimental groups were equivalent at the beginning of a research study. It provides assurance that any differences in outcomes are a result of the intervention rather than other factors. If the control and experimental groups are not equivalent, data analysis techniques must be altered in order to gain an understanding of the impact of the treatment. Using an alpha level of 0.05, an independent t-test comparing the means of the pretest of the control and experimental group was performed. Results indicate that there was a statistically significant difference between the groups ($t = 3.423, p = 0.001$). The mean and the standard deviation, which are descriptive statistics, further support a conclusion of
inequality between the groups (see Table 1). As noted in Chapter 3, this may have been caused by the high dropout rate in the control group, as well as, the difference in the sample size between the two groups. The statistically significant difference indicates that the use of independent t-tests to compare the posttest, midterm and final exam between the control and experimental groups could not be performed.

Table 1. Independent sample t-test comparing pretest scores for the control and experimental groups

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental</td>
<td>37</td>
<td>36.86</td>
<td>11.629</td>
<td>1.912</td>
</tr>
<tr>
<td>Control</td>
<td>25</td>
<td>48.80</td>
<td>15.832</td>
<td>3.166</td>
</tr>
</tbody>
</table>

Gain scores are a measure of change and, as a result, the absence of equivalency between the control and experimental groups does not affect the use of gain scores as a basis for comparison. Therefore, gain scores were calculated by deducting the pretest score from the posttest score for each student. I then used a one-way analysis of variance (ANOVA) to compare the means of the gain scores between the two groups. The results of the test (see Table 2) showed that the difference in the mean gain scores between the two groups was not statistically significant \( f = 2.788, p = 0.10 \). Both the Welch and Brown-Forsythe robust tests of equality of means indicate the same, with \( p = 0.106 \) for both. There is no statistically significant difference in student achievement between the experimental and control groups as measured by the gain scores.
Table 2. One-way ANOVA test comparing control and experimental groups’ gain scores.

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental</td>
<td>37</td>
<td>21.73</td>
<td>13.938</td>
<td>2.291</td>
</tr>
<tr>
<td>Control</td>
<td>25</td>
<td>15.52</td>
<td>14.981</td>
<td>2.996</td>
</tr>
</tbody>
</table>

When sample sizes are small, an ANOVA test is not sensitive enough to determine significance. Given the sample sizes in this study were small, not surprisingly, the ANOVA indicated no statistically significant difference. Therefore, I also performed a test of effect size. Effect size indicates the power and direction of a change and is more sensitive when used with small sample sizes. In addition, Hedge’s $g$ was used as it is recommended for sample sizes which are greater than 50 participants. The result was an effect size of $g = 0.427$. Note that this is slightly above the average impact of interventions ($r = 0.40$) as determined by Hattie (2012). It supports the position that Concept Mapping and Cooperative Learning are more effective with regards to learning. Nonetheless, additional evidence is required with regards to the posttest, midterm and final exam scores.

Next, a paired sample t-test compared the pretest to the posttest, midterm and final exam within each group. The objective of a paired sample t-test is to compare two related means to determine whether or not a statistically significant difference exists. Because the paired sample t-test compared results within groups, the non-equivalence of the experimental and control groups on the pretest did not affect the outcomes of the tests. In addition, in order to determine the magnitude of change between the pretest, posttest, midterm, and final exam, I calculated the effect size using Hedge’s $g$.  

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An examination of the results indicates that a statistically significant difference existed between all paired sample t-tests for the experimental group (see Table 3). In addition, Hedge’s g indicates the magnitude of the change was large, ranging from $g = 1.429$ to 2.610.

Table 3. Experimental group paired sample t-test statistics and Hedge's g.

<table>
<thead>
<tr>
<th>Paired Samples</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
<th>Correlation</th>
<th>Sig.</th>
<th>t</th>
<th>p</th>
<th>g</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pair 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pretest</td>
<td>36.86</td>
<td>11.629</td>
<td>1.912</td>
<td>0.335</td>
<td>0.042</td>
<td>-9.483</td>
<td>.000</td>
<td>1.780</td>
</tr>
<tr>
<td>PostTest</td>
<td>58.59</td>
<td>12.515</td>
<td>2.058</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pair 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pretest</td>
<td>36.86</td>
<td>11.629</td>
<td>1.912</td>
<td>0.241</td>
<td>0.151</td>
<td>-13.01</td>
<td>.000</td>
<td>2.610</td>
</tr>
<tr>
<td>MidTerm</td>
<td>66.54</td>
<td>10.867</td>
<td>1.787</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pair 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pretest</td>
<td>36.86</td>
<td>11.629</td>
<td>1.912</td>
<td>0.13</td>
<td>0.442</td>
<td>-6.649</td>
<td>.000</td>
<td>1.429</td>
</tr>
<tr>
<td>FinalExam</td>
<td>55.22</td>
<td>13.720</td>
<td>2.256</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

A paired sample t-test was then performed using the control group data. Again, the level of significance was set to 0.05 and the Hedge’s g was used to calculate effect size (see Table 4). An examination of the results indicates that a statistically significant difference existed between all paired samples for the control group. The effect size calculation of Hedge’s g indicates the magnitude of the change was large, ranging from $g = 0.720$ to 1.063.
As can be seen from Tables 3 and 4, the effect size was large for both the experimental and control groups for all three paired samples. This, however, does not indicate that the use of the new instructional strategies was the cause. Students who are taught using only direct instruction can be expected to have significant effect sizes between the beginning and the end of a semester. That said, effect size provides a common measure that can be used to compare different outcomes: it provides a standardized measure of effect (Howell, 2011).

I was able to perform a comparison between the effect size for all paired samples for both the experimental and control groups. This allowed me to see if the magnitude of the change was greater for the experimental group (see Table 5). This will indicate whether the treatment resulted in greater learning for the experimental group as measured by examination scores.
As can be seen from the results in Table 5, the effect size in the experimental group was significantly larger for all three paired samples. The largest effect is noted between the pretest and the midterm. The midterm was 2.5 hours in length and covered seven chapters, three of which were based on introductory accounting concepts. The final exam, which shows the smallest effect, was three hours in length and covered twelve chapters of material, four of which are considered the most challenging of the course (investments, capital assets and intangible assets).

Unsurprisingly, the effect size was greatest between the pretest and the midterm and smallest between the pretest and the final exam. In addition, the effect size for all three measures was significantly larger for the experimental group than it was for the control group in all three paired samples. The conclusion from this analysis is that Concept Mapping and Cooperative Learning as a teaching strategy resulted in greater learning, as measured by examination scores, than Direct Instruction and Cooperative Learning.

Table 5. Experimental and control group comparison of Hedge's g.

<table>
<thead>
<tr>
<th>Paired Samples</th>
<th>Pretest</th>
<th>PostTest</th>
<th>Pretest</th>
<th>MidTerm</th>
<th>Pretest</th>
<th>FinalExam</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pair 1</td>
<td></td>
<td></td>
<td>1.025</td>
<td>1.780</td>
<td>0.755</td>
<td></td>
</tr>
<tr>
<td>Pair 2</td>
<td></td>
<td></td>
<td>1.063</td>
<td>2.610</td>
<td>1.547</td>
<td></td>
</tr>
<tr>
<td>Pair 3</td>
<td></td>
<td></td>
<td>0.720</td>
<td>1.429</td>
<td>0.709</td>
<td></td>
</tr>
</tbody>
</table>

Finally, Pearson's correlation coefficient shows similar results to the paired sample t-tests for the experimental group (see Table 6) with regards to correlation
calculation. The posttest is significantly related to the midterm \( (p = .000) \) and the final exam \( (p = .000) \). Given the three assessments, which were compared to the pretest, are significantly related we should see that the effect size for all three tests, when compared to the pretest, would be large, which they are (see Table 5). The pretest is slightly related to the posttest \( (p = 0.042) \) but not to the midterm or the final exam. Again, this supports the results of the effect size because, if the results were strongly related, then the effect size would have been smaller. The posttest is strongly related to the midterm and the final exam and the midterm is strongly related to the final exam. Again, this supports the outcome of the analysis for the effect size as it indicates that the outcomes for all three assessments where highly related \( (p = .000) \). Therefore, it can be expected that a large effect size exists between the pretest and the posttest, midterm, and final exam, which Hedge’s \( g \) confirms.

Table 6. Pearson's correlation coefficient (r) statistics for the experimental group.

<table>
<thead>
<tr>
<th>Experimental Group</th>
<th>Pretest</th>
<th>PostTest</th>
<th>MidTerm</th>
<th>FinalExam</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest</td>
<td>Pearson Correlation</td>
<td>1</td>
<td>.335*</td>
<td>.241</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.042</td>
<td>.151</td>
<td>.442</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>37</td>
<td>37</td>
<td>37</td>
<td>37</td>
</tr>
<tr>
<td>PostTest</td>
<td>Pearson Correlation</td>
<td>.335*</td>
<td>1</td>
<td>.638**</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.042</td>
<td>.000</td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>37</td>
<td>37</td>
<td>37</td>
<td>37</td>
</tr>
<tr>
<td>MidTerm</td>
<td>Pearson Correlation</td>
<td>.241</td>
<td>.638**</td>
<td>1</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.151</td>
<td>.000</td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>37</td>
<td>37</td>
<td>37</td>
<td>37</td>
</tr>
<tr>
<td>FinalExam</td>
<td>Pearson Correlation</td>
<td>.130</td>
<td>.580**</td>
<td>.740**</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.442</td>
<td>.000</td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>37</td>
<td>37</td>
<td>37</td>
<td>37</td>
</tr>
</tbody>
</table>

* Correlation is significant at the 0.05 level (2-tailed).
** Correlation is significant at the 0.01 level (2-tailed).
Pearson's correlation coefficient was also calculated for the control group (see Table 7). It again reinforces the results obtained from the paired sample t-tests and the effect size (see Table 4). A strong correlation exists between the pretest and posttest ($p = 0.011$) that supports the smaller effect size determined by Hedge’s $g$ ($g = 1.025$ compared to the experimental group of $g = 1.780$). A significant correlation emerged between the midterm and the final exam but not between the posttest, midterm and final exam. This indicates that the effect size would be smaller between the pretest and posttest for the control group than what is found in the experimental group, which it is.

Table 7. Control group Pearson's correlation coefficient (r) statistics.

<table>
<thead>
<tr>
<th>Control Group</th>
<th>Pretest</th>
<th>PostTest</th>
<th>MidTerm</th>
<th>FinalExam</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest</td>
<td>Pearson Correlation</td>
<td>1</td>
<td>.499*</td>
<td>.218</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>.011</td>
<td>.295</td>
<td>.056</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>25</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>PostTest</td>
<td>Pearson Correlation</td>
<td>.499*</td>
<td>1</td>
<td>.185</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>.011</td>
<td>.375</td>
<td>.144</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>25</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>MidTerm</td>
<td>Pearson Correlation</td>
<td>.218</td>
<td>.185</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>.295</td>
<td>.375</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>25</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>FinalExam</td>
<td>Pearson Correlation</td>
<td>.387</td>
<td>.301</td>
<td>.824**</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>.056</td>
<td>.144</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>25</td>
<td>25</td>
<td>25</td>
</tr>
</tbody>
</table>

* Correlation is significant at the 0.05 level (2-tailed).
** Correlation is significant at the 0.01 level (2-tailed).

In summary, although the control group had an advantage at the beginning of the course as measured by the comparison of means for the pretest, by the end of the course the experimental group had a greater effect size across all subsequent tests. This is
further supported by an analysis of the Pearson Correlation Coefficient. Overall, the results indicate that Concept Mapping and Cooperative Learning as teaching strategies resulted in greater learning, as measured by examination scores, than Direct Instruction and Cooperative Learning.

**Qualitative analysis**

Gains in learning are important outcomes of interventions but in addition, we must consider the impact of interventions on students’ thoughts and feelings. The second research question explored what the students' experiences were with regards to the use of Cooperative Learning and Concept Mapping in intermediate accounting. The question was examined and analyzed through the use of surveys.

Qualitative analysis was also used to explore my third research question: did the use of different instructional strategies impact the perceptions of students towards accounting in general? This question was examined and analyzed through the use of two identical surveys, administered at the beginning and end of the semester.

**Thoughts/Feelings towards Group Work Survey**

A self-reported, paper and pencil survey was administered to students in both the control and experimental classes two weeks before the end of class. The survey included 30 questions which students answered using a Likert scale that ranged from not at all true of me (1) to very true of me (5).

The purpose of qualitative analysis is to develop themes that will help the researcher understand the thoughts and feelings of the participants. Therefore, coding the questions on the survey is a key first step in categorizing those questions into themes. The coding used was adapted from Cantwell and Andrews’ (2002) research and their use
of factor analysis. Questions were divided into three main categories: preference for individual learning, preference for group learning, and discomfort in group learning. The coding of the questions can be seen in Appendix H. Several of the questions were not included in the theme groupings as these items included aspects of several themes. Inclusion in any one theme would have biased the results and therefore these questions will be analyzed separately.

Likert scales are ordinal data and therefore can be summed by theme to gain an understanding of each group’s response to the individual theme. For analysis purposes, students were split into control and experimental groups so as to better understand the impact of group work when it is combined with concept mapping as compared to direct instruction. The results, by group, are shown on Table 8.

**Preference for individual learning**

Students in the control group showed a slightly higher preference for individual learning (2% higher) when compared to the experimental group. In addition, more students were uncertain with regards to their preference (9%). If the preference for individual work and unsure are added together, 34% of the control group compared to 24% of the experimental group either prefer individual work or were unsure. There was less uncertainty with regards to preferences in the experimental group (9% lower). From my observations during classes this may have been a consequence of the use of Power Point presentations. They tend to be word-heavy and students in the control group often read them individually. Reading is, by nature, individual and therefore students in the groups were often silently reading the Power Point presentations. Concept maps have far fewer words and they can be skimmed quickly for content.
In addition, from my observations during class, students often discussed the concept maps within their groups, asking other group members for clarification on the connections between concepts or how the individual maps connected to each other. This generated discussion and sharing with other group members. Therefore, the medium used to communicate information may have resulted in a slight preference for individual learning in the control group.

**Preference for group learning**

I found little variation between the experimental and control group with regards to their preferences for group work. Overall, the majority of students (73% experimental, 75% control) preferred group work. The difference between the results of the preference for individual work and the preference for group work for the control group was interesting. When asked about preferences for individual work, 18% of students in the control group were uncertain. When questions were phrased to support group work, the percentage of uncertain students drops to 10% and the difference was added to the “very true of me” category of preferring group work. This is supported both by my observations in class and my discussions with students after the research was completed. In class, students moved their desks and joined their groups immediately upon entering the room, both for the control and experimental group. Since the end of the research, past students have commented about how much they enjoyed working within the groups and how they felt it helped them to learn the complex content of the course better.
Table 8. Results of group work survey by experimental and control groups.

<table>
<thead>
<tr>
<th>Feelings Towards Group Work</th>
<th>Experimental</th>
<th>Control</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not at all true of me</td>
<td>73%</td>
<td>66%</td>
<td>-7%</td>
</tr>
<tr>
<td>Unsure</td>
<td>9%</td>
<td>18%</td>
<td>9%</td>
</tr>
<tr>
<td>Very true of me</td>
<td>18%</td>
<td>16%</td>
<td>-2%</td>
</tr>
<tr>
<td>Preference for Individual Work</td>
<td>13%</td>
<td>15%</td>
<td>2%</td>
</tr>
<tr>
<td>Unsure</td>
<td>14%</td>
<td>10%</td>
<td>-4%</td>
</tr>
<tr>
<td>Very true of me</td>
<td>73%</td>
<td>75%</td>
<td>2%</td>
</tr>
<tr>
<td>Discomfort in Group Work</td>
<td>77%</td>
<td>76%</td>
<td>-1%</td>
</tr>
<tr>
<td>Unsure</td>
<td>3%</td>
<td>7%</td>
<td>4%</td>
</tr>
<tr>
<td>Very true of me</td>
<td>20%</td>
<td>17%</td>
<td>-3%</td>
</tr>
</tbody>
</table>

**Discomfort with group learning**

Discomfort with group work was higher than I expected. Between the experimental (20%) and control group (17%), there were a number of students who felt uncomfortable with some aspect of group work. Upon a review of individual responses, I found that students who indicated a preference for individual work also indicated discomfort in group work. The discomfort in group work was focused on communicating and sharing ideas with other group members. Although the majority of students did not feel discomfort, we must recognize that this may be a factor for some students. Their discomfort could be addressed in future courses through additional training on group skills. In addition, students could occasionally be offered an opportunity to work individually so that they are not forced to work within groups in every class.

**Other Observations**
Questions that fell outside of the three categories were analyzed individually for additional insight into students' thoughts and feelings about group work. The analysis included a comparison between the results for the control and experimental groups.

Two questions were asked with respect to working in either same-sex or mixed-sex groups. The results were conflicting. A total of 22% of the students in the experimental group indicated they preferred working in same-sex groups compared to only 7% of the control group. Another question asked if students preferred to work in mixed-sex groups. A total of 6% of the experimental group indicated "not at all true of me", signifying they preferred same-sex groups. This was significantly less (16%) than when they were asked a direct question about same-sex groups. That made the data difficult to analyze due to the conflict. The control group's results did not change significantly. In both questions, the majority of students in the experimental and control groups (>75%) indicated that they prefer to work in mixed-sex groups.

Three questions asked students about their feelings of acceptance, involvement and self-esteem. Feelings of acceptance by others within the group, when combining both "not at all true of me" and "unsure", indicated that greater than 20% of students were uncertain about acceptance within the group (22% experimental, 29% control). Approximately 20% of students from both the control and experimental groups indicated that they did not feel involved even when their group was meeting their goals (21% experimental, 18% control).

Finally, a significant amount of students from both groups indicated “not at all true of me” or “not very true of me” when asked if contributing ideas to the group made them feel better about themselves (21% experimental, 32% control). To better
understand those results I compared students who had answered negatively to those three questions to students who preferred individual work and felt discomfort with group work. Students who preferred individual work and indicated discomfort with group work were more likely to answer negatively with regards to acceptance, involvement and self-esteem. This is supported by Cantwell and Andrews (2002) who found that students with higher levels of social anxiety tended to answer these questions negatively.

Setting up group goals was important for 50% of the experimental students but only 36% of the control students. This may be a result of the structure of this study. As the instructor I ensured that groups stayed on task and met their goals in class. I required group processing every other week and students were incentivized to attend classes through a bonus system, so absenteeism was minimal. In addition, groups were not required to work together outside of class. This may have resulted in students’ perception that group goals were not critical to the success of a group.

Although group rules were not considered critical, students did indicate that group work should be divided evenly; approximately 75% of both groups considered evenly divided work important. The results of these two questions indicated that students do not see the connection between structured group rules and how the group divides the work between members. This indicates to me that future group work should be started with a discussion about setting group rules so students understand its importance.

I was surprised to see that only 69% of the experimental group and 68% of the control group indicated that they did not like when a group member was dominant. A dominant group member can create dysfunctional groups where other group members become free-riders as a consequence. A subsequent question asked if students felt “in
charge” when working in a group: 39% of the control group and 44% of the experimental group indicated they did. A review of individual responses showed that students who did not like a dominant group member were also more likely to indicate that they felt in charge. In addition, students who’s responses showed lower levels of acceptance, involvement and self-esteem where more likely to choose “disagree” with regards to feeling in charge as well as “agree” to a dominant group member. Although in-class discussions with regards to the detrimental effects of dominant group members was part of the group skills training during the semester, additional discussions in future classes appears to be necessary.

Research shows that students prefer, and are more productive in, self-selected groups (Chapman, Meuter, Toy, & Wright, 2006). That said, 43% of the control group preferred instructor designed groups. Although the students in the experimental group preferred choosing their own groups (56%), a number of students indicated “unsure” (19% experimental and 25% control). When students were asked, at the beginning of term, whether they preferred instructor created or self-selected groups, they strongly indicated the latter. Yet the survey shows different results; without further information from students postulating as to why this was the case would not be appropriate.

I should note that the research on effective group work indicates that, in most cases, teacher selected groups are more effective than student selected groups (van der Laan Smith & Spindle, 2007). Reality also illustrates that, when we go to work, we do not work with groups of our choice, we work with whoever is there … random assignment to groups. As educators, we need to be sensitive to students developing the skills to work with a wide variety of individuals.
Thoughts/Feelings towards Concept Map Survey

A self-reported paper and pencil survey was administered to students in the experimental class two weeks before the end of the semester. The survey included 30 questions which students answered using a Likert scale that ranged from not at all true of me (1) to very true of me (5). The survey was adapted from a survey developed by Rabie (2007) to assess students’ perceptions of the usefulness of concept mapping. Rabie (2007) used factor analysis, expert reviewers, as well as, student reviewers to ensure the reliability and validity of the survey. Questions were divided into four main categories: usefulness/ease of use, benefits, memorization, and overall value. The coding of the questions can be seen in Appendix I. Several questions were not included in the categories as these items included aspects of more than one category. These questions were therefore analyzed individually.

Usefulness and Ease of Use

Survey questions about the usefulness of expert-developed concept maps included perceptions of the usefulness for learning and obtaining better grades, as well as one question regarding ease of use. Only 66% of the students indicated that statements about the usefulness of concept maps were very true or somewhat true of them. The student's perception of usefulness did not link with their response to the ease of use question: 84% of students felt that expert-developed concept maps were easy to use. Also, students' overall perceptions of usefulness did not correlate with perceptions of value (analyzed later in this chapter). A further investigation of individual responses to the survey questions within this category indicated that 81% considered expert-developed concept maps useful for learning. Only 55% considered expert-developed concept maps useful to
obtain better grades on assessments. This may indicate that students used expert-developed concept maps as a means to learn more effectively.

**Benefits of Use**

A total of 79% of students indicated that expert-developed concept maps benefited them in areas such as understanding complex concepts (84%), seeing the structure of concepts (88%), understanding relationships between concepts (84%), applying concepts to problems (72%), organizing content (91%) and providing a summary of the chapter (84%). Students were not as positive about the benefits of expert-developed concept maps for discovering concepts they may have missed (69%) and helping them think more deeply about the content (56%). This links to students feelings about expert-developed concept maps and memorization, analyzed later in this chapter.

Student's overall positive response to expert-developed concept maps may have been impacted by how they were used in the class. Rabie (2007) noted that students must be explicitly taught the benefits of concept maps in order to ‘buy in’ to their use. As a consequence, throughout the course, I recommended different ways of using the expert-developed concept maps provided. For instance, I suggested that students keep their expert-developed concept maps beside them while they read the textbook. This allowed them to tie the concepts shown on the map to those in the textbook and likely contributed to the 91% of students who found expert-developed concept maps helped them organize content from each chapter.

In addition, Maas and Leauby (2005) noted that instructors must demonstrate the usefulness of concept mapping in order to make it explicit to students. I accomplished
this by using the expert-developed concept maps on the document camera for every class. Finally, I stressed to students that expert-developed concept maps were for learning, which may have impacted their thoughts about the benefits of concept mapping overall.

**Memorization**

One concern is that 69% of students felt that concept maps helped them to memorize content. Students may be using the expert-developed concept maps in the same way that they use Power Point presentations, which is for memorization (Hay, et al., 2008). One modifying factor with regards to concept maps is that they are not linear in nature. In order to use concept maps, students must make sense of the structure and connections between the concepts. This may help students move from memorization to understanding and deeper learning. In addition, the answer to these questions may have been based on student's use of memorization in past courses. Certainly the results of the quantitative analysis in this paper indicate that learning was higher for students who used the concept maps in conjunction with cooperative learning.

**Overall Value**

Only two questions were included in the value for learning category: one stated positively and one negatively. Although 78% of students indicated that concept maps were worthwhile in the positively phrased item, 91% of students indicated that concept maps were not a waste of time. When compared to students' perceptions of usefulness (81%) and the benefits of expert-developed concept maps (79%), the student's perceptions of overall value link more to the positively phrased statement than the negatively phrased statement. This may indicate that students are hesitant to fully
support expert-developed concept maps directly but are more likely to defend their use when stated negatively.

**Other Observations**

Questions that fell outside of the four categories were analyzed individually for additional insight into students' thoughts and feelings about concept maps. Overall, 82% of students enjoyed using expert-developed concept maps. This is further supported by the fact that 84% of students felt that expert-developed concept maps should be used in future accounting courses. Approximately 69% of students indicated that they understood how to create concept maps and 59% expected to use concept maps in the future to help them in other courses.

Unfortunately, this did not translate into wanting to create concept maps: only 25% of students tried to create their own concept maps and 59% indicated that they did not want to learn how to create concept maps. This is supported by my personal experience: During the semester, only one student requested training on how to build concept maps. Note that student’s reluctance to attempt concept mapping is not unusual. Novak's (2010) noted that university students have greater difficulty creating concept maps than young children, likely due to their preference for memorization.

**Perceptions of Accounting Surveys**

Both the experimental and control groups completed two self-reported, paper and pencil surveys on the first and last day of the course. The surveys included seventeen questions and utilized a Likert scale (1 = strongly agree; 5 = strongly disagree) to measure students’ perceptions of accounting. The second survey at the end of the course was identical except it was adjusted for past tense.
The purpose of the two surveys was to assess the change in students’ perceptions towards accounting between the beginning and end of the course. The survey was adapted from two surveys developed by Caldwell et al. (1996) and Geiger and Ogilby (2000) to assess students’ perceptions of accounting in an introductory accounting course. Questions were coded into three categories: usefulness of accounting, student interest in learning accounting, and the role of accountants. The coding of each question on the survey can be seen in Appendix J.

Using the coding, I grouped the outcomes to obtain a frequency measure of the three categories. I then collapsed the responses into condensed categories (agree, unsure, disagree). This allowed me to clearly analyze changes from pre- to post-survey. The final two questions (instructor’s affect and prediction of final grade) were analyzed separately. For analysis purposes, students were split into control and experimental groups to better understand the impact of the teaching strategy on students’ perceptions of accounting. The results are found in Table 9 (experimental) and Table 10 (control).

**Usefulness of accounting**

The questions included in this category incorporated concepts of usefulness for future careers, courses, and business decisions. Students in the experimental group showed little change in their perceptions (76% to 77%). The control group began with higher perceptions of usefulness (85%) but this declined to 76% by the end of the term. Analyzing each question within the category showed that the control group declined on every question regarding perceptions of usefulness: future courses (-11%), future careers (-11%) and future decision making (-5%). Overall the control group showed a much larger decline in their perceptions of the usefulness of accounting.
Table 9. Results of experimental group pre and post survey on students’ perceptions of accounting.

<table>
<thead>
<tr>
<th></th>
<th>Usefulness</th>
<th>Interest</th>
<th>Role</th>
<th>Instructor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agreement</td>
<td>76%</td>
<td>76%</td>
<td>49%</td>
<td>67%</td>
</tr>
<tr>
<td>Unsure</td>
<td>6%</td>
<td>4%</td>
<td>12%</td>
<td>7%</td>
</tr>
<tr>
<td>Disagreement</td>
<td>18%</td>
<td>20%</td>
<td>39%</td>
<td>26%</td>
</tr>
<tr>
<td><strong>Post-Survey</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agreement</td>
<td>77%</td>
<td>70%</td>
<td>42%</td>
<td>70%</td>
</tr>
<tr>
<td>Unsure</td>
<td>2%</td>
<td>8%</td>
<td>12%</td>
<td>10%</td>
</tr>
<tr>
<td>Disagreement</td>
<td>22%</td>
<td>22%</td>
<td>46%</td>
<td>20%</td>
</tr>
<tr>
<td><strong>Change during Semester</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agreement</td>
<td>1%</td>
<td>-6%</td>
<td>-7%</td>
<td>3%</td>
</tr>
<tr>
<td>Unsure</td>
<td>-4%</td>
<td>4%</td>
<td>0%</td>
<td>3%</td>
</tr>
<tr>
<td>Disagreement</td>
<td>4%</td>
<td>2%</td>
<td>7%</td>
<td>-6%</td>
</tr>
</tbody>
</table>

Table 10. Results of control group pre and post survey on students’ perceptions of accounting.

<table>
<thead>
<tr>
<th></th>
<th>Usefulness</th>
<th>Interest</th>
<th>Role</th>
<th>Instructor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agreement</td>
<td>85%</td>
<td>76%</td>
<td>46%</td>
<td>72%</td>
</tr>
<tr>
<td>Unsure</td>
<td>5%</td>
<td>10%</td>
<td>16%</td>
<td>10%</td>
</tr>
<tr>
<td>Disagreement</td>
<td>10%</td>
<td>14%</td>
<td>38%</td>
<td>18%</td>
</tr>
<tr>
<td><strong>Post-Survey</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agreement</td>
<td>76%</td>
<td>68%</td>
<td>49%</td>
<td>82%</td>
</tr>
<tr>
<td>Unsure</td>
<td>4%</td>
<td>9%</td>
<td>15%</td>
<td>0%</td>
</tr>
<tr>
<td>Disagreement</td>
<td>20%</td>
<td>23%</td>
<td>36%</td>
<td>18%</td>
</tr>
<tr>
<td><strong>Change during Semester</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agreement</td>
<td>-9%</td>
<td>-8%</td>
<td>3%</td>
<td>10%</td>
</tr>
<tr>
<td>Unsure</td>
<td>-1%</td>
<td>-1%</td>
<td>-1%</td>
<td>-10%</td>
</tr>
<tr>
<td>Disagreement</td>
<td>10%</td>
<td>8%</td>
<td>-2%</td>
<td>1%</td>
</tr>
</tbody>
</table>
Student interest in learning accounting

The questions in this category encompassed concepts pertaining to whether students considered accounting interesting, its application to their major, confidence in solving problems, motivation to learn accounting, finding the study of accounting personally rewarding and intellectually stimulating. Students in the experimental group showed a slight decline (6%), with a slight increase in uncertainty towards their interest in learning accounting. In order to gain a better understanding of this decline, I analyzed individual questions for the experimental group. There was a 27% decline in student’s confidence that they could solve new problems by referring to written explanations in the textbook. This is unsurprising considering the textbook is complex and information dense. There was an increase in understanding accounting when discussing concepts (13%) and solving problems (10%) with peers, which supports the finding from the group work survey. All other areas, such as finding the course personally rewarding (-10%), intellectually stimulating (-10%), being motivated to do well (-13%), and learning a lot in the class (-3%) declined.

Students in the control group showed a similar decline in their interest in learning accounting (8%). By analyzing individual questions, I found an increase in understanding accounting when discussing concepts (14%) and solving problems (20%) with peers, which again supports the finding from the group work survey. Students found accounting slightly more interesting (5%) but in all other measure there was a decline: application to their major (-11%), confidence in solving questions from the textbook (-12%), finding the course personally rewarding (-18%), intellectually stimulating (-19%), being motivated to do well (-22%) and learning a lot in the class (-8%).
The results overall indicate a small decline in both groups with regards to their interest in learning accounting; however, the decline when analyzed by question indicates that the control group showed a larger increase in perception of group learning and a larger decrease in all other measures of interest in learning accounting.

**Role of Accountants**

Three questions were included in the measure of students’ perception of the role of accountants. Two questions characterized accounting stereotypes (accountants must get the numbers right and the problems they encounter only have one solution). The third question indicated that accountants must understand business to solve problems. The results of this question were reversed prior to summation within this category.

Overall, students in the experimental group showed a reduction in the stereotype of an accountant (11%). The control group showed a slight increase in the stereotype of an accountant (3%). Each of the individual questions, when analyzed separately, also showed only a slight increase; however, 49% of the control group and 42% of the experimental group have a stereotypical view of accountants. This indicates that student’s fail to see that accounting is a dynamic and changing environment where business decisions are an integral part of their job.

**Impact of Instructor**

One question was used to indicate whether or not students felt that the instructor affected their opinion of the usefulness of the course. Students in the experimental group showed little change (3%) whereas students in the control group showed an increase (10%). Analyzing the outcome was difficult as all other categories for the control group showed a decline. Therefore, no conclusions can be drawn from this question.
**Students’ prediction of grade**

Two independent tests were used to determine if the method of instruction affected students’ predictions of their final grade in the course. The first compared the means of the control and experimental groups for their pre-survey grade predictions. Results indicate that there was no statistically significant difference between the two groups’ predictions ($t = -1.781, p = 0.080$). The second independent t-test was used to compare the means of the post-survey grade predictions between the control and experimental group. Again, the results indicate no statistically significant difference between the control and experimental groups’ predictions of their final grade at the end of the course ($t = 0.517, p = 0.607$). Therefore, the method of instruction appears to have had no impact on students' predictions concerning their academic outcome in the course.
Chapter 5 - DISCUSSION

In this chapter I start with a brief review of the purpose of this study. I then present the key findings and the implications of this study for future practice. Following that I discuss the limitations of my research and end with my reflections as an instructor/researcher.

Introduction

In this study, I employed a mixed-methods research approach to explore the impact of implementing two instructional strategies, Concept Mapping and Cooperative Learning, in an intermediate accounting course at a Canadian university. These two strategies were compared to a control group who received Direct Instruction and Cooperative Learning. The rationale behind this study was three fold: (1) to improve student learning as measured by examination scores, (2) to understand the thoughts and feelings of students with regards to group work and concept mapping, and (3) to comprehend the perceptions of students with regards to accounting.

The study covered a broad range (learning, thoughts, feelings, perceptions) because I came to realize that, although improving student learning is an important aspect of educational research, the environment that students experience at university should not be ignored when implementing changes to ones instructional practices. Using accounting-speak, students are important entities within the teaching and learning equation and the sum of those individual parts must be made greater than the whole. Only through research that explores the qualitative, as well as, the quantitative aspect of implementing new innovations can I truly understand the benefits and drawbacks to my students.
Research Question 1

The first research question focused on whether or not the combined implementation of Concept Mapping and Cooperative Learning would be more effective than Direct Instruction and Cooperative Learning in improving student learning as measured by examination scores. Concept Mapping in this study was defined as a paper print-out of expert-developed concept maps. This was compared to Direct Instruction using a paper print-out of expert-developed Power Point presentations. The analysis found that student learning, as measured by examination scores, was improved by the combination of these two instructional strategies. The results indicate that concept maps increase meaningful learning.

An important outcome of this research is that cooperative learning was held constant between the two groups, which allowed for an assessment of the impact of concept mapping as compared to direct instruction. When gain scores were compared between the control and experimental groups, the results showed an effect ($g = 0.427$) that was slightly above the average effect of educational interventions ($r = 0.40$) as determined by Hattie (2012). A within group comparison of all assessments (pretest, posttest, midterm, and final exam) indicated that the effect size of multiple teaching strategies on the experimental group was significantly greater, with the difference ranging from 0.709 and 1.547 (see Table 5).

Another factor that must be considered is the duration of the treatment. Nesbit and Adesope (2006), in their meta-analysis of the impact of concept mapping, indicate the effect size of using expert-developed concept maps in a classroom was 0.366. The treatment duration of the studies included in their meta-analysis was measured in minutes.
(< or > 60 minutes). My research appears to be the first long-term study on the impact of combining Concept Mapping and Cooperative Learning in accounting education.

One of the challenges faced by university instructors teaching intermediate accounting is the high dropout rates (Kilpatrick et al., 2013; Shoulders & Hicks, 2008; Waples, Darayseh, 2005) as well as high failure rates (Burnett et al., 2010; Sanders & Willis, 2009). Although retention rates were not a part of this research study, the experimental group had higher retention rates. In total, 41% of the control group dropped the course before the final exam date compared to 24% of the experimental group. When combining drop-out rates with failure rates, 50% of the control group either dropped or failed the course compared to 41% of the experimental group. One explanation might be the use of the combined instructional strategies having a positive effect on drop out and failure. That said, further research is required to determine if this is the case.

**Research Question 2**

The second research question was designed to collect and understand students' thoughts and feelings with regards to Cooperative Learning (both control and experimental) and Concept Mapping (experimental only). I start by discussing the thoughts and feelings of students towards Cooperative Learning for both the control and experimental group and follow that with their thoughts and feelings towards Concept Mapping for the experimental group.

The results of the survey on thoughts and feelings towards group work were combined under three basic measures (preference for individual work, preference for group work, and discomfort with group work). One clear message that emerged was that not all students preferred to work within cooperative groups. Discomfort with group
work centered on communicating and sharing questions or ideas with other group members.

Cantwell and Andrew's (2002) explored both the cognitive and psychological factors of student's feelings towards group work. Their research indicates that students who felt discomfort with group work and preferred individual work "were distinguished by higher levels of social anxiety and lower levels of sociability" (p. 87). They also note that "discomfort with group learning relates primarily to psychological rather than cognitive factors" (p. 87). Overall, even though a percentage of students preferred individual work, the majority of students in both the experimental and control group preferred working in cooperative groups.

Other results of the survey indicate that students prefer mixed-sex groups and groups where work is evenly divided. Although setting up group goals was not considered important (experimental 50%, control 36%), this was likely due to the structure of the study. Students were only required to work in groups within class where the instructor assigned and monitored group goals. This may have impacted student's perception of the importance of group goals.

The results of the survey on thoughts and feelings towards expert-developed concept maps (experimental group only) were divided into four categories: (1) usefulness/ease of use, (2) benefits, (3) memorization, and (4) overall value. The majority of students found expert-developed concept maps useful for learning and easy to use. Students indicated that the benefits of expert-developed concept maps included understanding complex concepts, seeing the structure of concepts, understanding the relationship between concepts, and applying concepts to problems. As concept maps are
made of nodes connected with linking words that specifically indicate structure and relationships, the outcome to these survey questions are not surprising. In addition, students strongly indicated that expert-developed concept maps helped them to organize content and provided a summary of the contents of the chapters. Considering that the expert-developed concept maps were built from the content of the textbook chapters’ students predictably found expert-developed concept maps helpful in both of these areas.

Of concern are the two thirds of students who indicated they used the expert-developed concept maps for memorization. Interestingly, student learning as measured by examination scores did not support students’ responses to this question. The final exam involved critically evaluating scenarios to determine choices based on evidence provided; questions that were not conducive to memorization. Student learning, as measured by examination scores, indicate that students in the experimental group outperformed students in the control group. This supported the proposition that expert-developed concept maps improved learning of complex concepts in accounting.

Research Question 3

My final question asked if the method of instruction affected students' perceptions of accounting. The results of the pre- and post-survey were combined into three basic measures: (1) usefulness of accounting, (2) interest in accounting, and (3) the role of accountants). The results were disappointing. The only measures to increase were two questions with regards to discussing concepts and solving problems in groups. Once these two questions were removed, there was a decline in measures of both the usefulness of accounting and interest in accounting. In addition, results show that students' perception of the role of accountants was overall stereotypical. They perceived
accountants as having to "get the numbers right" and problems being "structured" when, in reality, accounting is a dynamic and changing career where business decisions are the focus of most accounting work.

The negative outcome of this survey is consistent with the findings of Caldwell et al. (1996). Their research used the same survey for students in both first and second year accounting courses. They found that "student perceptions of accounting...[are]...at least partially fixed...and therefore less sensitive to the cooperative learning treatment" (p. 28). In addition, the fact that intermediate accounting is a recognized "killer course" likely impacted the outcome of this survey. Not surprising, the students in both control and experimental groups, who were either third or fourth year students, showed declines in all areas except group work.

**Implications**

The results of my research have important implications for practice. Limited research exists that focuses on combining instructional methods such as the use of concept mapping and cooperative learning within the accounting discipline. In addition, inadequate long-term research exists on the use of expert-developed concept maps in any discipline. Although this research is limited given the small sample size, it does provide support for the use of expert-developed concept maps combined with cooperative learning in accounting classrooms to improve academic outcomes and potentially lower drop-out and failure rates. In addition, the use of expert-developed concept maps may provide a counter-balance to university students’ preference for rote learning (Hay et al., 2008). The use of concept maps, which require students to analyze nodes and links
between nodes, as well as understand the structure of concepts, seem to result, based on
the outcomes of this research, in deeper learning.

Unfortunately, the use of cooperative groups has severe limitations with regards
to implementation in practice due to the structure within universities. This study required
special permission from the university to limit the size of the two classes in this study to
55 students. Normal class sizes range from 100 to 200 students and sometimes larger. In
addition, the instructor/researcher received special permission to obtain rooms with
movable desks. Standard university rooms have tiered desks to maximize the amount of
students within any given space. Rooms with movable desks rarely house more than 75
students, another factor that limits their use with larger class sizes. Both factors severely
limit the ability of university instructors to create cooperative groups that would
encompass all five elements of the Learning Together model (Johnson et al., 1998). The
structure of the groups within this study would be difficult to replicate in practice and,
therefore, the results may have limited implications within standard university
environments.

The results of the students’ thoughts and feelings towards the concept mapping
survey have implications for practice. Intermediate accounting is considered one of the
most challenging courses for both accounting and finance majors. One of the reasons is
the content density and complexity of intermediate textbooks. The use of expert-
developed concept maps in this research study has shown that they can be used to more
clearly communicative these complex concepts to students. Overall, students appear to
welcome the use of expert-developed concept maps. They perceive the value as helping
them to understand both complex concepts and the interconnection between concepts.
One limitation of this research to practice is that instructors must develop proficiency in concept mapping and in structuring groups effectively. As noted by Novak and Gowin (1984), children are better at creating concept maps than adults are. Maas and Leauby (2005) note that "[a]s educators, we are challenged to change our teaching methods and to enhance the students' learning environment" (p. 83) but they also note that concept mapping in accounting is limited. "The most obvious reason for this lack of experimentation is the amount of time it takes to learn the methodology...and the process to integrate the tool into courses" (p. 84). Their solution is to provide an inventory of ready-to-use maps, thereby "eliminating the need for either faculty or students to learn the skill" (p. 84).

The value of concept mapping is the building of the map itself (Novak & Gowin, 1984). My development of concept maps for this research study allowed me to improve my understanding of the critical concepts within the course. I was able to better communicate the content to students because I used my own self-created concept maps. As noted by Trifone (2006), "simply requiring students to use concept mapping to learn more meaningfully is not sufficient to ensure more meaningful learning" (as cited in Rabie, 2007, p. 199). I believe the same is true of instructors who wish to use expert-developed concept maps within their courses. My concern is that instructors, already overwhelmed with both the content density of most accounting courses as well as managing large class formats, will be unwilling to devote the necessary time to develop concept mapping skills.
Limitations

Although cooperative learning was held constant between the two groups, the effect of cooperative learning may have been greater in the experimental group. Concept maps, from personal observation in the class, appeared to generate greater discussion amongst group members. This may be due to concept maps using less text, which allows students to quickly scan for information (Novak, 2010) and leaves more time for discussion. Power Point presentations, on the other hand, are more ‘wordy’ by nature and required additional time to read, which may have decreased the time available for group discussion. Therefore, it is possible that the impact of cooperative learning was underestimated in the experimental class and the contribution of concept mapping to student learning may have been overestimated.

Concept mapping is more cognitively engaging than information provided as written text (Nesbit & Adesope, 2006). Possibly, the positive outcomes in student learning in this study are due to the greater engagement experienced when processing concept maps rather than the actual concept maps themselves.

Problem-based learning is ranked 24th by Hattie (2012) with regards to influences on achievement and has an average effect size of 0.61. As such, it outranks both concept mapping (27th) and cooperative learning (28th). Problem-based learning refers to students working together in groups to solve complex problems. Problem-based learning has been shown to impact academic outcomes (Dochy et al., 2003) as well as students' perception of the learning environment (Ferreire & Trudel, 2012). Although problem-based learning was used throughout the semester in both the control and experimental
groups, problem-based learning requires effective group skills to maximize its affect (Dochy et al., 2003).

It is possible that the cooperative groups in the experimental group experienced greater interaction within groups and this, in combination with problem-based learning, may be underestimated in this study. In addition, the students’ thoughts and feelings towards concept mapping may have been increased due to the use of problem-based learning; that is, its impact on students' perception of the learning environment was not taken into account.

Self-reflections

I was first introduced to concept mapping while enrolled in a course on improving teaching during my Master of Arts program. Working in a group of three we were required to create a concept map that would summarize what "good teaching" encompassed, based both on our beliefs, as well as, the content of the course. I remember my dismay at being given an assignment for which I did not have full knowledge, understanding or aptitude. One year later, I was again enrolled in the same course, a "do-over" as Dr. Barrie Bennett, my professor at the time, so succinctly put it. It was not until I had completed my "do-over" that I began to understand the power of concept mapping in relation to my own learning but I was, at best, an early mechanical user. (Note that mechanical level of use refers to Hall and Hords' (2011) work on the Concerns Based Adoption Model and refers to one of seven levels of use.).

During the process of conducting this research, I moved from this early stage of adoption (mechanical) through to a routine user and, hopefully, on my way to becoming a refined user. This was only possible because, in preparation for this research study, I
converted an eight-hundred-page textbook into more than one hundred concept maps. By doing so, I have experienced the potential of its impact on learning, as well as, subsumed concept mapping into my understanding of communicating knowledge.

In particular, as an organizational strategy, I have used it to display complex concepts and, as such, have reconstructed my intermediate accounting course so as to focus on key concepts. As noted by Nesbit and Adesope (2006), "[i]n constructing a hierarchical concept map, learners must judge the relative inclusivity or specificity of concepts, a process that demands cognitive engagement" (p. 419). As a professional accountant, I felt I "knew" accounting well enough to teach it but the act of creating concept maps to communicate my knowledge and the knowledge within the textbook, resulted in clarity of understanding that I had not, either as a professional accountant or as an instructor, experienced before.

During this research, I learned first-hand the volume of work involved in research and that, often, caution is called for so as to not become over-whelmed. Given the opportunity to do this research over again, I may not have asked three questions covering such broad areas but narrowed my focus to student outcomes or thoughts and feelings about the instructional strategies rather than both of those plus perceptions of accounting. In addition, I would have considered implementing this strategy into an introductory accounting course with younger students who may have been open to attempting self-created concept maps.

As noted by Novak and Gowin (1984), and gleamed from this research, students in third and fourth year university were not open to learning new methods although they clearly appreciated the expert-developed concept maps that I provided. All of this has
resulted in many reflections during this process and I know these lessons will help me when designing and constructing future research into concept mapping in accounting.

Finally, I have learned that, regardless of whether my research can be generalize to other disciplines and educational setting or not, instructors in both higher education and elsewhere are unlikely to benefit unless they are researchers themselves. Improving the experience of our students requires that we continually change. To do so we must persistently review research on teaching and learning to both improve students' academic outcomes as well as attitudes and perceptions. In addition, we must understand and be willing to struggle while adopting new innovations.

I am a good teacher not because I love what I do or have an aptitude for teaching but because I strive, every day that I teach, to do better than the day before. It is only through research that I can continue to learn how to teach so that my student's learning experience reaches its fullest potential. Teach and learning is a circle and this research has helped me to fully embrace that as truth.
References


Appendix A

Pre-Test & Post-Test
INTERMEDIATE ACCOUNTING
IN-CLASS PRETEST/POST-TEST
DURATION: 45 MINUTES

INSTRUCTIONS TO STUDENTS:

- CIRCLE the BEST answer for each Multiple Choice question.
- Show your calculations beside ANY multiple choice question for which you are required to do calculations in order to obtain an answer.

Participant Number: ________________________________

Date: ______________________________________________

<table>
<thead>
<tr>
<th>Question Number</th>
<th>Possible Marks</th>
<th>Suggested Time in Minutes</th>
<th>Marks Awarded</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>25</td>
<td>45</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>25</td>
<td>45</td>
<td></td>
</tr>
</tbody>
</table>
Multiple Choice (25 MARKS)

Select the only one correct answer for each of the following 25 questions.

1. Which of the following is a true statement about inventory systems?
   a. Periodic inventory systems require more detailed inventory records.
   b. Perpetual inventory systems require more detailed inventory records.
   c. A periodic system requires cost of goods sold be determined after each sale.
   d. A perpetual system determines cost of goods sold only at the end of the accounting period.

2. Hunter Corporation purchased merchandise inventory with an invoice price of $8,000 and credit terms of 2/10, n/30. What is the net cost of the goods if Hunter Corporation pays within the discount period?
   a. $8,000
   b. $7,840
   c. $7,200
   d. $7,360

3. If a purchaser using a perpetual inventory system pays the transportation costs, then the
   a. Merchandise Inventory account is increased.
   b. Freight Expense account is increased.
   c. Delivery Expense account is increased.
   d. The cash account is increased.

4. Sales discounts is what type of account?
   a. a revenue account
   b. an asset account
   c. a liability account
   d. an expense account

5. Under the perpetual inventory system the collection of a $500 account within the 2 percent discount period will result in a
   a. debit to Sales Discounts for $10.
   b. debit to Accounts Receivable for $490.
   c. credit to Cash for $490.
   d. credit to Accounts Receivable for $490.
6. If goods in transit are shipped FOB destination,
   a. the seller has legal title to the goods until they are delivered.
   b. the buyer has legal title to the goods during transit.
   c. the transportation company has legal title to the goods while the goods are in transit.
   d. Legal title to the goods is unknown until the goods have been delivered.

7. Which of the following items should be included in a company's inventory at the balance sheet date?
   a. Goods in transit which were purchased FOB destination.
   b. Goods received from another company for sale on consignment.
   c. Goods sold to a customer, which are being held for the customer to call for at his or her convenience.
   d. None of these.

8. In a period of rising prices, which of the following inventory cost formulas generally results in the lowest net earnings figure?
   a. FIFO.
   b. Average cost.
   c. The inventory cost formula only affects the balance sheet.
   d. More information is needed to answer this question.

**Use the following information to answer question 9:**

Transactions for the month of June were:

<table>
<thead>
<tr>
<th></th>
<th>Purchases</th>
<th></th>
<th>Sales</th>
</tr>
</thead>
<tbody>
<tr>
<td>June</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>(bal) 400 @ $3.20</td>
<td>June 2</td>
<td>300 @ $5.50</td>
</tr>
<tr>
<td>3</td>
<td>1,100 @ 3.10</td>
<td>6</td>
<td>800 @ 5.50</td>
</tr>
<tr>
<td>7</td>
<td>600 @ 3.30</td>
<td>9</td>
<td>500 @ 5.50</td>
</tr>
<tr>
<td>15</td>
<td>900 @ 3.40</td>
<td>10</td>
<td>200 @ 6.00</td>
</tr>
<tr>
<td>22</td>
<td>250 @ 3.50</td>
<td>18</td>
<td>700 @ 6.00</td>
</tr>
<tr>
<td></td>
<td>25</td>
<td>25</td>
<td>150 @ 6.00</td>
</tr>
</tbody>
</table>

9. Assuming that perpetual inventory records are kept in dollars, the ending inventory on a FIFO basis is
   a. $1,900.
   b. $1,920.
   c. $2,065.
   d. $2,100.
10. XYZ Inc. is a wholesaler of electronics. They purchased 1,000 units of Product X for $500 each during 2011. The selling price was $750 per unit. At year end, they had 100 units on hand and, due of changes in technology, the selling price was reduced to $450. The value of ending inventory on the balance sheet at year end would be

   a. $50,000  
   b. $75,000  
   c. $45,000  
   d. $40,000

11. Under the allowance method of recognizing uncollectible accounts the entry to recognize the collection of a previously written off uncollectible account

   a. increases the allowance for doubtful accounts.  
   b. has no effect on the allowance for doubtful accounts.  
   c. decreases the allowance for doubtful accounts.  
   d. increases net income.

12. The following information is available for Sorensen Company:

   | Allowance for doubtful accounts at Dec 31, 2010 | $  8,000 |
   | Credit sales during 2011                      | 400,000  |
   | Accounts receivable written off during 2011   | 9,000    |

As a result of a review and aging of accounts receivable it has been determined that an allowance for doubtful accounts of $7,500 is needed at December 31, 2011. What is the ending balance in the allowance for doubtful accounts?

   a. $6,500  
   b. $7,500  
   c. $8,500  
   d. $15,500

13. During the year, Bergh Company made an entry to write off a $4,000 uncollectible account. Before this entry was made, the balance in accounts receivable was $60,000 and the balance in the allowance account was $4,500. The net realizable value of accounts receivable after the write-off entry would be

   a. $60,000.  
   b. $59,500.  
   c. $51,500.  
   d. $55,500.
14. Dalton Corporation purchases a new delivery truck for $35,000. The logo of the company is painted on the side of the truck for $800. The truck licence is $60. The truck insurance is $900 for the year. What does Dalton record as the cost of the new truck?

a. $35,060  
b. $35,800  
c. $35,860  
d. $36,760

15. The balance in the Accumulated Depreciation account represents the

a. cash fund to be used to replace assets.  
b. amount to be deducted from the cost of the asset to arrive at its fair value.  
c. amount charged to expense in the current period.  
d. amount charged to expense since the acquisition of the asset.

16. Equipment with a cost of $160,000, an estimated residual value of $10,000, and an estimated life of 4 years, was purchased on April 1 2011. The company uses the straight-line method to calculate depreciation. What is the amount of depreciation expense for 2011?

a. $40,000  
b. $30,000  
c. $37,500  
d. $28,125

17. A company purchased factory equipment for $200,000. It is estimated that the equipment will have a $20,000 residual value at the end of its estimated 5-year useful life. If the company uses the double declining balance method of depreciation and a 40% depreciation rate, the amount of depreciation expense recorded for the second year after purchase would be

a. $43,200.  
b. $48,000.  
c. $72,000.  
d. $80,000.
18. A company sells an asset. The original cost of the asset is $45,000 and the company has recorded accumulated depreciation of $38,000. The sale results in a gain on sale of $2,000. How much cash did the company receive for the sale of this asset?

   a. $2,000 
   b. $5,000 
   c. $7,000 
   d. $9,000

19. On the TSX (Toronto Stock Exchange) Ms. Ritchie, a shareholder of Tremblant Corporation, sold $200 shares to Ms. Rowcroft for $3,150. As a result of this transaction,

   a. Tremblant Corporation’s shareholders’ equity increased $3,150. 
   b. Tremblant Corporation's shareholders' equity decreased $3,150 
   c. Tremblant Corporation's cash account increased by $3,150 
   d. Tremblant Corporation's financial position did not change.

20. The board of directors of Easton Limited declared a cash dividend of $0.50 per share on 84,000 common shares on July 15, 2011. The dividend is to be paid on August 15, 2011, to shareholders of record on July 31, 2011. The effects of the journal entry to record the declaration of the dividend on July 15, 2011, are to

   a. decrease assets and decrease shareholders’ equity. 
   b. decrease assets and decrease liabilities. 
   c. increase liabilities and decrease shareholders’ equity. 
   d. Increase liabilities and decrease assets.

21. The net impact of a stock dividend and a stock split on the accounting equation is:

<table>
<thead>
<tr>
<th>Stock Dividend</th>
<th>Stock Split</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. No impact</td>
<td>No impact</td>
</tr>
<tr>
<td>b. Increase shareholders' equity</td>
<td>No impact</td>
</tr>
<tr>
<td>c. No impact</td>
<td>Increase shareholders' equity</td>
</tr>
<tr>
<td>d. Increase shareholders' equity</td>
<td>Increase shareholders' equity</td>
</tr>
</tbody>
</table>
22. The primary purpose of the cash flow statement is to

   a. provide information about the investing and financing activities during a period.
   b. prove that revenues exceed expenses if there are net earnings.
   c. provide information about the cash receipts and cash payments during a period.
   d. facilitate banking relationships.

23. In calculating cash flows from operating activities using the indirect method, a gain on the sale of equipment is

   a. added to net earnings.
   b. deducted from net earnings.
   c. recorded as a note to the statement.
   d. ignored because it is a non-cash item.

24. Green Corporation reported net earnings of $50,000 for the year. During the year, accounts receivable increased by $8,000, accounts payable decreased by $4,000 and depreciation expense of $6,000 was recorded. Net cash provided by operating activities for the year, using the indirect method, is

   a. $54,000.
   b. $56,000.
   c. $50,000.
   d. $44,000.

25. The indirect and direct methods of preparing the cash flow statement are identical except for the

   a. significant noncash activity section.
   b. operating activities section.
   c. investing activities section.
   d. financing activities section.
Appendix B

Perceptions of Accounting Survey
Accounting Survey

This survey has been designed to allow you to describe your expectations about accounting overall. Please respond truthfully, so that your answers will accurately describe your expectations with regards to accounting courses in general.

**Part A: Background Information**

Participant Number: ______________________________ Age _______ years

Nationality: Canadian _________ Other (please describe) ___________________

Ethnicity (e.g. Egyptian, Dutch, Japanese), ______________________

First language __________________ Gender (circle one): M / F

Year of study at this university (circle one) 1st 2nd 3rd 4th

What is your major (circle one)? Accounting Finance Other________________

In what term/year and where did you take Introductory Financial Accounting?

Term/year: ___________________________ at ______________________________

Are you retaking Intermediate Financial Accounting I? Y / N

If yes, in what term/year and where did you take Intermediate Financial Accounting I before?

Term/year: ___________________________ at ______________________________

Are you an Access Centre student? Y / N
Part B: Expectations of Accounting

The next part of this survey asks you to indicate your relative agreement or disagreement with regards to a number of statements. Please work through the statements, circling your immediate response. Think in terms of your expectation of ACCOUNTING OVERALL.

It is very important that you answer all the questions: please check that you have.

1 = strongly agree   2 = somewhat agree   4 = somewhat disagree   5 = strongly disagree

Try not to use 3 = unsure, unless you really have to

1. A knowledge of accounting will help me do well in my future business courses.
   1  2  3  4  5

2. Knowledge of accounting is applicable to my major.
   1  2  3  4  5

3. Discussions with my peers will help me to develop a better understanding of accounting.
   1  2  3  4  5

4. Knowledge of accounting will help me do well in my future career.
   1  2  3  4  5

5. I consider the study of accounting interesting.
   1  2  3  4  5

6. Studying accounting will give me business knowledge.
   1  2  3  4  5

7. I feel confident that I can solve new problems by referring to the explanations in the textbook.
   1  2  3  4  5

8. The job of an accountant is to get the numbers right.
   1  2  3  4  5

9. Accounting knowledge will help me make better business decision in the future.
   1  2  3  4  5

10. The problems that accountants deal with can only be solved in one way.
    1  2  3  4  5

11. I feel that doing well in this course will be personally rewarding.
    1  2  3  4  5

12. I think that the study of accounting will be intellectually stimulating.
    1  2  3  4  5

13. I am confident about solving accounting problems by discussing them with my peers in the class.
    1  2  3  4  5
14. I feel highly motivated to do well in this accounting course. 1 2 3 4 5

15. Accountants must understand business to solve accounting problems. 1 2 3 4 5

16. I expect to learn a lot in this intermediate accounting class. 1 2 3 4 5

17. I think the instructor will positively affect my opinion of the usefulness of this course. 1 2 3 4 5

18. I expect to receive a grade of __________ in this course. (Fill in the blank with your expected % grade at the end of the course.)

Thank you very much for spending time completing this survey.

Appendix C

Thoughts/Feelings Towards Group Work Survey
Feeling Towards Group Work

This questionnaire contains a number of statements about how you might feel about working in groups. If you feel the statement is very true of you, circle the "5". If you feel the statement is not true of you at all, circle the "1". If you feel the statement is partly true of you, circle the "2", "3", or "4". Remember that there are no right or wrong answers.

It is very important that you respond to all the questions: please check that you have.

1 = Not at all true of me.  2 = Not very true of me.  4 = Somewhat true of me.  5 = Very true of me.

Try not to use 3 = unsure, unless you really have to

1. I prefer to work in groups rather than alone.  1 2 3 4 5
2. I would have preferred to work in same-sex groups.  1 2 3 4 5
3. I felt I always made a significant contribution within my group.  1 2 3 4 5
4. I felt like I understood the information better after explaining it to other students in my group.  1 2 3 4 5
5. After working in my group I felt more accepted by others.  1 2 3 4 5
6. I sometimes struggled to understand what the group goals were.  1 2 3 4 5
7. I found I preferred to work alone even when in my group.  1 2 3 4 5
8. I feel it is important that groups set up rules at the start of a course.  1 2 3 4 5
9. I often felt that I was in charge of my group.  1 2 3 4 5
10. I think I prefer to work in mixed-sex groups.  1 2 3 4 5
11. I felt that, even when the group was achieving their goals, I did not feel involved or happy.  1 2 3 4 5
12. I would have preferred to choose our own groups.  1 2 3 4 5
13. I felt better about myself when I was contributing ideas to my group.  1 2 3 4 5
14. I felt unhappy whenever a member of my group took over.  
15. In a group I think that every member should contribute an equal amount of work.  
16. I felt afraid to ask for help from the other members of my group.  
17. I felt good when I was totally involved in my groups' achievements.  
18. I did not feel motivated to learn when working in my group.  
19. I think that everyone in a group should take responsibility for the groups' learning.  
20. I did not like studying when I am in my group.  
21. I often felt nervous when I had to communicate and share ideas with my group members.  
22. I found that I usually understood the ideas expressed by the other members of my group.  
23. I did not think that group work was an effective use of class time.  
24. I felt better when everyone in my group helped one another.  
25. I found it more confusing to work in my group than it was to work by myself.  
26. I prefer when the instructor chooses my group members.  
27. I rarely felt relaxed when working within my group.  
28. I do not feel responsible for other group members' learning.  
29. I sometimes feel let down by other group members.  
30. I enjoyed working in my group during this course.  

Thank you very much for spending time completing this survey.

Appendix D

Thoughts/Feelings Towards Concept Mapping Survey
Feeling Towards Concept Maps

This questionnaire contains a number of statements about how you might feel about the concept maps you were given in this course. If you feel the statement is very true of you, circle the "5". If you feel the statement is not true of you at all, circle the "1". If you feel the statement is partly true of you, circle the "2", "3", or "4". Remember that there is no right or wrong answers.

It is very important that you respond to all the questions: please check that you have.

1 = Not at all true of me.  2 = Not very true of me.  4 = Somewhat true of me.  5 = Very true of me.

Try not to use 3 = unsure, unless you really have to

1. I really enjoyed using the concept maps provided in this course.

2. I think the concept maps provided in this course helped me to learn more efficiently.

3. I feel like I understood the content of this course better because I used the concept maps.

4. The concept maps in this course helped me get a better grade on the online assignments.

5. The concept maps in this course helped me get a better grade on the midterm.

6. The concept maps in this course will help me to get better grade on the final exam.

7. I think that the concept maps provided were easy to use for studying.

8. I felt that the concept maps provided were worthwhile.

9. The concept maps provided helped me to better understand the complex concepts in this course.

10. The concept maps provided helped me to see the structure of the concepts more than I usually do in accounting courses.

11. The concept maps provided helped me to better understand the relationship between different concepts more than I usually do.
12. I think the concept maps provided helped me to see how the concepts taught could be applied to new problems.

13. The concept maps provided helped me to memorize information better.

14. I think the concept maps provided in the course helped me to identify important details to study.

15. The concept maps provided helped me to see if I had misunderstood a concept in the course.

16. The concept maps provided helped me to discover concepts that I would have missed.

17. The concept maps provided helped me to think more deeply about the concepts taught in this course.

18. The concept maps provided a summary of the content of the course.

19. The concept maps provided helped me to organize the content from each chapter.

20. I felt like the concept maps helped me review content for the midterm and the final exam.

21. Studying from the concept maps helped me to recall information during the midterm and the final exam.

22. I feel like the concept maps provided improved my approach to studying.

23. I though using the concept maps during class was a waste of time.

24. I tried to create my own concept maps to help me study for this course.

25. I expect to use concept maps in the future to help me study for other courses.

26. I understand the reason for creating and using concept maps to learn the content within a course.

27. I know how to create a concept map.

28. I wanted to learn more about how to create a good concept map.

29. When I first heard that we would be using concept maps in my section of this course I was concerned that it would negatively impact my grade in the course.
30. Overall I feel that concept maps should be used in future accounting courses.

Thank you very much for spending time completing this survey.

Appendix E

Informed Consent
You are enrolled in a section of Intermediate Accounting I, in which there is a research study being conducted. You can read more about the research study, below.

It is important to understand that completion of this survey is part of the informed consent process; a communication between the researcher and the participant that results in an agreement to be involved in a research study. All the information provided below must be read carefully in order to make a decision about participation.

I, Else Grech, am conducting a study as part of my Master’s degree in the Curriculum, Teaching, and Learning Department at The Ontario Institute for Studies in Education of the University of Toronto. Working under Professor Barrie Bennett, I will be carrying out a research study on the impact of Cooperative Learning, a teaching model, in combination with a teaching strategy called Concept Mapping in intermediate financial accounting. I would like to provide you with more information about this project.

University courses are most often taught through a lecture teaching model. As an instructor in accounting for 14 years I have noticed that this method often does not help students learn accounting. A large amount of research into Cooperative Learning, where students work in small groups, shows that student’s learning and interpersonal skills are improved. Little research, however, has been done into how Cooperative Learning and Concept Mapping together affect learning. A concept map is a type of flow chart which is used to summarize information. The purpose of this study is to discover if using Cooperative Learning together with Concept Mapping will improve learning for students in intermediate accounting.

This study is quasi-experimental. That means that students are divided into two groups. One group, called the control group, will be taught using cooperative learning. They will receive PowerPoint chapter summaries. The second group, called the experimental group, will also be taught using cooperative groups. The experimental group will receive concept map chapter summaries. Both groups will receive exactly the same information but provided in different ways. All of the groups, made up of 2 sections of intermediate financial accounting, will be taught by me, Else Grech.

I would like to stress that both groups will use the same syllabus, textbook, cover the same content, and receive the same quizzes, homework assignments, midterms and final exams. All assessments are common between the four sections and there will be no differences in content coverage between the control and experimental groups. Participation in this study will not affect your grade. Students in this study do not receive additional or bonus marks.

As part of this research participants are being asked to complete one of the following surveys:
1. A paper survey that is intended to identify your expectations of this course as well as provide the researcher with background information. (Approximately 10 minutes on the first day of class.)

2. A second survey at the end of the course that is intended to identify any changes in your perceptions of this course. (Approximately 10 minutes in the last week of classes.)

3. A paper survey about your experiences and opinions about the use of cooperative learning and concept maps in this accounting course. (Approximately 20 minutes a week before the last class.)

Participation in this survey is voluntary; students may refuse to complete this survey without any negative consequences to themselves, their relationship with the instructor or their grades. As an instructor-researcher I will not be informed of who participates and who does not because a third party, a Research Assistant, will be responsible for collecting all surveys for this research study.

When you consent to participate in this research study by completing this survey the results will be collected as part of the data for the study. All information provided and data collected is considered completely confidential. Data will not be disclosed to anyone and your name will not appear in any thesis or report resulting from this study. The name of the university will not be used. Data collected during this study will be retained for 6 months in a locked office. Only I, the researcher, the Research Assistant and my thesis supervisor, Dr. Barrie Bennett, will have access to the primary data. All data will be destroyed once the study is concluded. There are no known or anticipated risks to you as a participant in this study.

If you have any questions regarding this study please contact me. You can also contact my supervisor, Dr. Barrie Bennett in writing at Ontario Institute of Studies in Education, University of Toronto, Attention: Dr. Barrie Bennett, 252 Bloor Street West, Toronto, Ontario, ON M5S 1V5.

At the end of the time provided for completion of this survey please place the (completed or incomplete) survey in the envelope provided and return it to the research assistant.

Thank you.
Appendix F

Sample Expert-Developed Concept Map

Chapter 1
Financial Accounting Information:

A process of

(1) Identifying – what should be recorded?
(2) Measuring – what value should be used?
(3) Compiling – which GAAP to use?
(4) Communicating – financial information

To both internal and external users through the use of General Purpose Financial Statements

Financial Accounting Information:

Must be:

• Relevant – meaning timely
• Reliable – meaning they accurately and fairly represent the information they are intended to represent.
Users:
- External – managers, Board of Directors, CFO, CEO
- Internal – investors, potential investors, creditors, regulatory bodies, financial analysts, suppliers, etc.
- Both called “stakeholders”
- All have different needs and levels of knowledge

External Users:
- Have a critical and immediate need for information
- Need to make resource allocation decisions (also called process of capital allocation)
  - They have limited resources which must be used efficiently
  - Rely on General Purpose Financial Statements to make these decisions
- Decisions such as comparing the risk and returns of different investment opportunities
General Purpose Financial Statements:

- Are cost efficient as they provide useful information at the lowest cost to preparers.
- Prepared by management who should act in the best interest of capital markets and the economy but may act in self-interest.
- Audited by external auditors who add value due to independence.
- Auditors review the financial statements to ensure sound accounting policies are chosen by management.
- Auditors act on behalf of stakeholders.
- Stakeholders are anyone who prepares, relies on, reviews, audits, or monitors financial information.

General Purpose Financial Statements:

- Must be decision useful so as to assess the entity for the following:
  - Managements ability to protect and enhanced capital providers investments
  - Financial position
  - Performance of company
  - Managements performance
  - Ability to protect and enhance company's assets
  - Ability to generate net cash inflows including timing and uncertainty
  - Managements stewardship of economic resources
General Purpose Financial Statements:

- Use the accrual basis of accounting which:
  - Records events in period in which they occur
    - Such as revenue when provide service or deliver good and expenses when incurred, consumed or used
  - Allows for meaningful analysis of trends over time
  - Better indicates the company’s present and future ability to generate future cash flows
Appendix H

Thoughts/Feelings Towards Group Work - Coding
Coding of the thoughts and feelings towards group work survey.

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td>I prefer to work in groups rather than alone.</td>
<td>I*</td>
</tr>
<tr>
<td>2.</td>
<td>I would have preferred to work in same-sex groups.</td>
<td>O</td>
</tr>
<tr>
<td>3.</td>
<td>I felt I always made a significant contribution within my group.</td>
<td>G</td>
</tr>
<tr>
<td>4.</td>
<td>I felt like I understood the information better after explaining it to other students in my group.</td>
<td>G</td>
</tr>
<tr>
<td>5.</td>
<td>After working in my group I felt more accepted by others.</td>
<td>O</td>
</tr>
<tr>
<td>6.</td>
<td>I sometimes struggled to understand what the group goals were.</td>
<td>D</td>
</tr>
<tr>
<td>7.</td>
<td>I found I preferred to work alone even when in my group.</td>
<td>I</td>
</tr>
<tr>
<td>8.</td>
<td>I feel it is important that groups set up rules at the start of a course.</td>
<td>O</td>
</tr>
<tr>
<td>9.</td>
<td>I often felt that I was in charge of my group.</td>
<td>O</td>
</tr>
<tr>
<td>10.</td>
<td>I think I prefer to work in mixed-sex groups.</td>
<td>O</td>
</tr>
<tr>
<td>11.</td>
<td>I felt that, even when the group was achieving their goals, I did not feel involved or happy.</td>
<td>O</td>
</tr>
<tr>
<td>12.</td>
<td>I would have preferred to choose our own groups.</td>
<td>O</td>
</tr>
<tr>
<td>13.</td>
<td>I felt better about myself when I was contributing ideas to my group.</td>
<td>G</td>
</tr>
<tr>
<td>14.</td>
<td>I felt unhappy whenever a member of my group took over.</td>
<td>O</td>
</tr>
<tr>
<td>15.</td>
<td>In a group I think that every member should contribute an equal amount of work.</td>
<td>O</td>
</tr>
<tr>
<td>16.</td>
<td>I felt afraid to ask for help from the other members of my group.</td>
<td>D</td>
</tr>
<tr>
<td>17.</td>
<td>I felt good when I was totally involved in my groups' achievements.</td>
<td>G</td>
</tr>
<tr>
<td>18.</td>
<td>I did not feel motivated to learn when working in my group.</td>
<td>I</td>
</tr>
<tr>
<td>19.</td>
<td>I think that everyone in a group should take responsibility for the groups learning.</td>
<td>G</td>
</tr>
<tr>
<td>20.</td>
<td>I did not like studying when I am in my group.</td>
<td>I</td>
</tr>
<tr>
<td>21.</td>
<td>I often felt nervous when I had to communicate and share ideas with my group members.</td>
<td>D</td>
</tr>
<tr>
<td>22.</td>
<td>I found that I usually understood the ideas expressed by the other members of my group.</td>
<td>G</td>
</tr>
<tr>
<td>23.</td>
<td>I did not think that group work was an effective use of class time.</td>
<td>I</td>
</tr>
<tr>
<td>24.</td>
<td>I felt better when everyone in my group helped one another.</td>
<td>G</td>
</tr>
<tr>
<td>25.</td>
<td>I found it more confusing to work in my group than it was to work by myself.</td>
<td>I</td>
</tr>
<tr>
<td>26.</td>
<td>I prefer when the instructor chooses my group members.</td>
<td>O</td>
</tr>
<tr>
<td>27.</td>
<td>I rarely felt relaxed when working within my group.</td>
<td>D</td>
</tr>
<tr>
<td>28.</td>
<td>I do not feel responsible for other group members' learning.</td>
<td>O</td>
</tr>
<tr>
<td>29.</td>
<td>I sometimes feel let down by other group members.</td>
<td>I</td>
</tr>
<tr>
<td>30.</td>
<td>I enjoyed working in my group during this course.</td>
<td>I*</td>
</tr>
</tbody>
</table>

Note: I = Preference for individual work; G = preference for group work; D = discomfort in group work; O = other measure; * = item reverse scored

Appendix I

Thoughts/Feelings Towards Concept Mapping Survey - Coding
Coding of the thoughts and feelings towards concept maps survey.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>I really enjoyed using the concept maps provided in this course.</td>
</tr>
<tr>
<td>2.</td>
<td>I think the concept maps provided in this course helped me to learn more efficiently.</td>
</tr>
<tr>
<td>3.</td>
<td>I feel like I understood the content of this course better because I used the concept maps.</td>
</tr>
<tr>
<td>4.</td>
<td>The concept maps in this course helped me get a better grade on the online assignments.</td>
</tr>
<tr>
<td>5.</td>
<td>The concept maps in this course helped me get a better grade on the midterm.</td>
</tr>
<tr>
<td>6.</td>
<td>The concept maps in this course will help me to get better grade on the final exam.</td>
</tr>
<tr>
<td>7.</td>
<td>I think that the concept maps provided were easy to use for studying.</td>
</tr>
<tr>
<td>8.</td>
<td>I felt that the concept maps provided were worthwhile.</td>
</tr>
<tr>
<td>9.</td>
<td>The concept maps provided helped me to better understand the complex concepts in this course.</td>
</tr>
<tr>
<td>10.</td>
<td>The concept maps provided helped me to see the structure of the concepts more than I usually do in accounting courses.</td>
</tr>
<tr>
<td>11.</td>
<td>The concept maps provided helped me to better understand the relationship between different concepts more than I usually do.</td>
</tr>
<tr>
<td>12.</td>
<td>I think the concept maps provided helped me to see how the concepts taught could be applied to new problems.</td>
</tr>
<tr>
<td>13.</td>
<td>The concept maps provided helped me to memorize information better.</td>
</tr>
<tr>
<td>14.</td>
<td>I think the concept maps provided in the course helped me to identify important details to study.</td>
</tr>
<tr>
<td>15.</td>
<td>The concept maps provided helped me to see if I had misunderstood a concept in the course.</td>
</tr>
<tr>
<td>16.</td>
<td>The concept maps provided helped me to discover concepts that I would have missed.</td>
</tr>
<tr>
<td>17.</td>
<td>The concept maps provided helped me to think more deeply about the concepts taught in this course.</td>
</tr>
<tr>
<td>18.</td>
<td>The concept maps provided a summary of the content of the course.</td>
</tr>
<tr>
<td>19.</td>
<td>The concept maps provided helped me to organize the content from each chapter.</td>
</tr>
<tr>
<td>20.</td>
<td>I felt like the concept maps helped me review content for the midterm and the final exam.</td>
</tr>
<tr>
<td>21.</td>
<td>Studying from the concept maps helped me to recall information during the midterm and the final exam.</td>
</tr>
<tr>
<td>22.</td>
<td>I feel like the concept maps provided improved my approach to studying.</td>
</tr>
<tr>
<td>23.</td>
<td>I though using the concept maps during class was a waste of time.</td>
</tr>
<tr>
<td>24.</td>
<td>I tried to create my own concept maps to help me study for this course.</td>
</tr>
<tr>
<td>25.</td>
<td>I expect to use concept maps in the future to help me study for other courses.</td>
</tr>
<tr>
<td>26.</td>
<td>I understand the reason for creating and using concept maps to learn the content within a course.</td>
</tr>
<tr>
<td>27.</td>
<td>I know how to create a concept map.</td>
</tr>
<tr>
<td>28.</td>
<td>I wanted to learn more about how to create a good concept map.</td>
</tr>
<tr>
<td>29.</td>
<td>When I first heard that we would be using concept maps in my section of this course I was concerned that it would negatively impact my grade in the course.</td>
</tr>
<tr>
<td>30.</td>
<td>Overall I feel that concept maps should be used in future accounting courses.</td>
</tr>
</tbody>
</table>

Appendix J

Perceptions of Accounting Survey - Coding
Coding of perception of accounting survey.

<table>
<thead>
<tr>
<th>No.</th>
<th>Question</th>
<th>Coding</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A knowledge of accounting will help me do well in my future business courses.</td>
<td>Usefulness</td>
</tr>
<tr>
<td>2</td>
<td>Knowledge of accounting is applicable to my major.</td>
<td>Interest</td>
</tr>
<tr>
<td>3</td>
<td>Discussions with my peers will help me to develop a better understanding of accounting.</td>
<td>Interest</td>
</tr>
<tr>
<td>4</td>
<td>Knowledge of accounting will help me do well in my future career.</td>
<td>Usefulness</td>
</tr>
<tr>
<td>5</td>
<td>I consider the study of accounting interesting.</td>
<td>Interest</td>
</tr>
<tr>
<td>6</td>
<td>Studying accounting will give me business knowledge.</td>
<td>Usefulness</td>
</tr>
<tr>
<td>7</td>
<td>I feel confident that I can solve new problems by referring to the explanations in the textbook.</td>
<td>Interest</td>
</tr>
<tr>
<td>8</td>
<td>The job of an accountant is to get the numbers right.</td>
<td>Role</td>
</tr>
<tr>
<td>9</td>
<td>Accounting knowledge will help me make better business decision in the future.</td>
<td>Usefulness</td>
</tr>
<tr>
<td>10</td>
<td>The problems that accountants deal with can only be solved in one way.</td>
<td>Role</td>
</tr>
<tr>
<td>11</td>
<td>I feel that doing well in this course will be personally rewarding.</td>
<td>Interest</td>
</tr>
<tr>
<td>12</td>
<td>I think that the study of accounting will be intellectually stimulating.</td>
<td>Interest</td>
</tr>
<tr>
<td>13</td>
<td>I am confident about solving accounting problems by discussing them with my peers in the class.</td>
<td>Interest</td>
</tr>
<tr>
<td>14</td>
<td>I was highly motivated to do well in this accounting course.</td>
<td>Interest</td>
</tr>
<tr>
<td>15</td>
<td>Accountants must understand business to solve accounting problems.</td>
<td>Role *</td>
</tr>
<tr>
<td>16</td>
<td>I expect to learn a lot in this intermediate accounting course.</td>
<td>Interest</td>
</tr>
<tr>
<td>17</td>
<td>I think the instructor will positively affect my opinion of the usefulness of this course.</td>
<td>Instructor</td>
</tr>
</tbody>
</table>

*Item 15 - reverse scored.